November 27, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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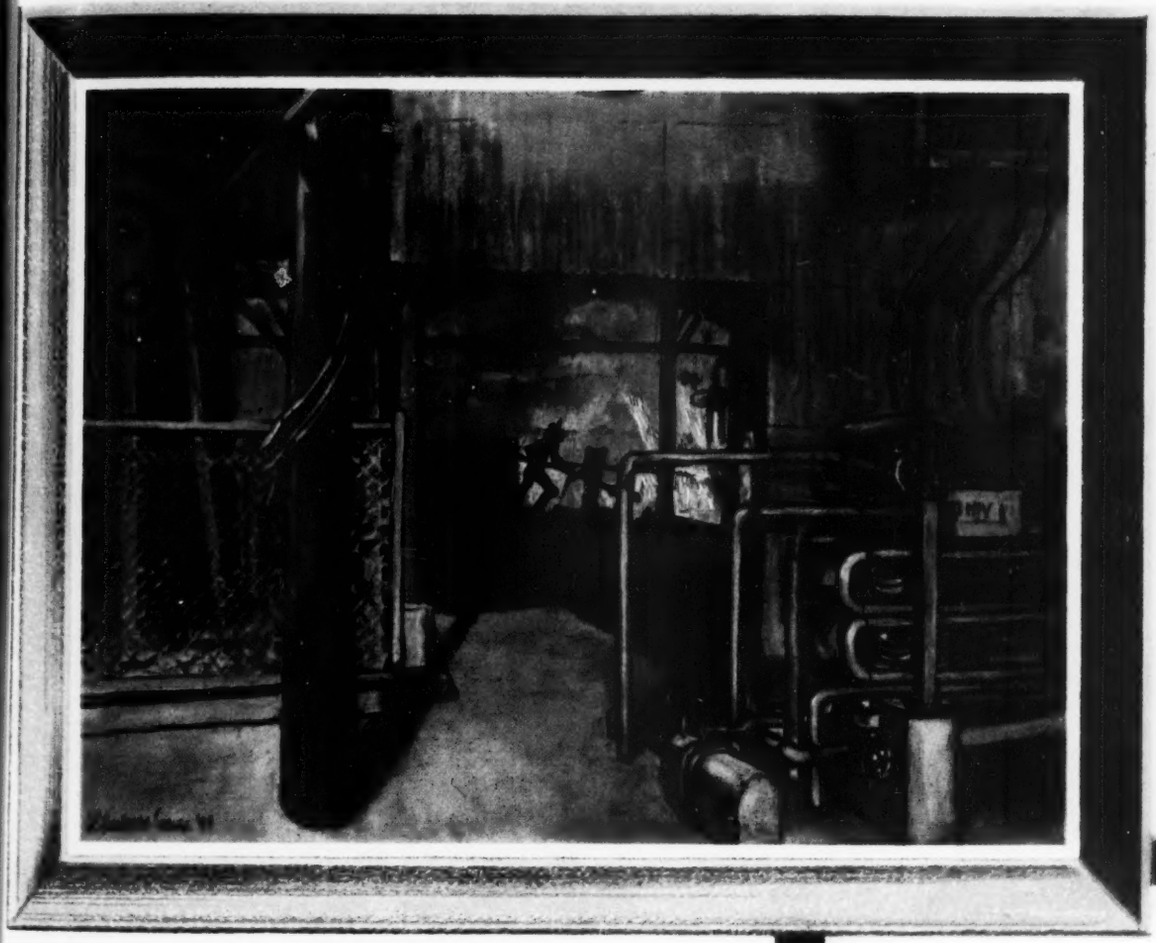

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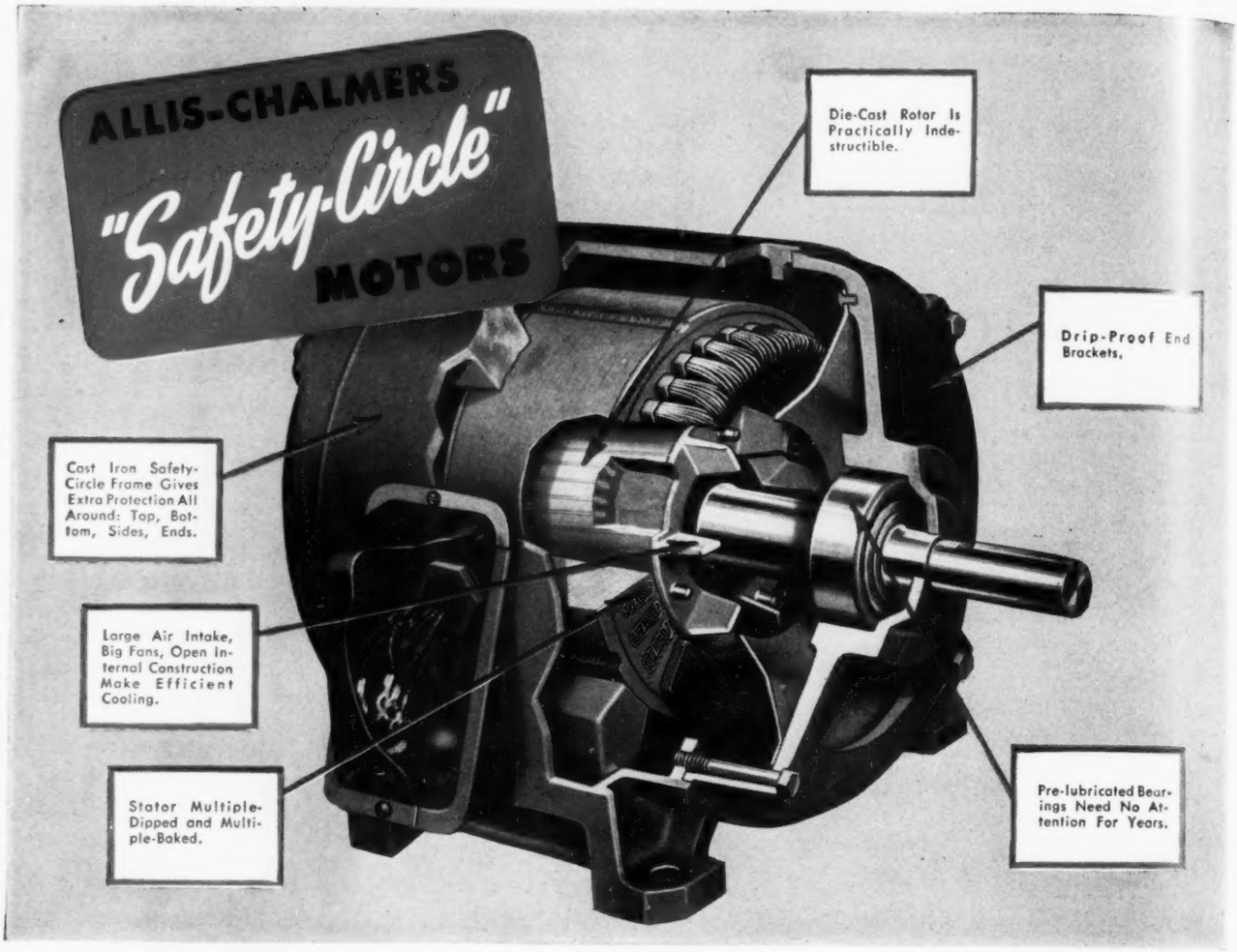
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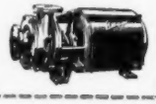

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Behind the Scenes . . .

Knee-Deep in Editors

We were knee-deep in editors a while back at a meeting in Washington of the Society of Business Magazine Editors. The organization is a professional group of top men from more than 100 leading business journals, with over 2 million readers.

We're pleased to report that the editors' liquor was good, food excellent and talk first-rate. After dinner we saw a corps of experts go into action in questioning a speaker from the National Production Authority.

At a business meeting Irwin Such, editor of STEEL, was elected first vice president of the society. New president is John W. McPherrin, editor of the *American Druggist*. He succeeds Paul Wooton, of Chilton Publications, who was named chairman of the Executive Committee for a five-year term.

Last Place

We're getting a lot of help in our researches about personal names that end telephone directories, a project we began Oct. 16 and continued Nov. 6. W. D. Wilson of Detroit has a nominee for last place who looks like a winner to us. He's one Zeke Zzzpt listed in the Detroit suburban section. Mr. Zzzpt wins by a comfortable margin over our last nominee for the position, Ziggie Zzyx, mentioned Nov. 6. Mr. Zzzpt wins by a whisper over another nominee, Ricardo Zzyzz, who can be found at the end of the Los Angeles directory's central section. Mr. Zzyzz was backed by C. H. Specht of California Cornice, Steel & Supply Corp.

Trouble Shooters

Having trouble in getting steel now that the Korean war promises to be a dragged-out affair? What did the steel industry do about expanding to meet the rising demand in World War II?

Figuring that a study of the parallel situation during World War II will be helpful in planning to meet the present steel supply difficulties, Penton Publishing Co.—STEEL's publisher—has made available *Steel Expansion for War*. The book describes the added capacity and cost of every steelmaking facility built during World War II. The volume was written by W. A. Hauck, chief of the Steel Control Branch of the War Production Board during World War II. Order your copy from Penton's Book Department, Penton Bldg., Cleveland 13.

Something else available to help you solve current industrial problems are reprints of the sixth in STEEL's series on depreciation and re-equipment reform. That is carried today, beginning on page 30, and is a forum on metalworking opinion as to what industry and government should do about depreciation. The forum isn't the last in STEEL's coverage of the subject, but it is the final shot in the current series that included installments May 8, June 19, July 31, Aug. 21 and Oct. 9.

Slick Gift

You generous readers have been showering us with gifts lately. The latest is from Benson Reark of Princeton, Ind., who's a tool man from way back. He got to wondering about the razor's edge, the most personal tool of all. For the last two years he's been fooling with solutions to do for the razor edge what lubricants and coolants do for machine cutting tools. He came up with Shave-Slick. We've tried it, and it works fine.

Puzzle Corner

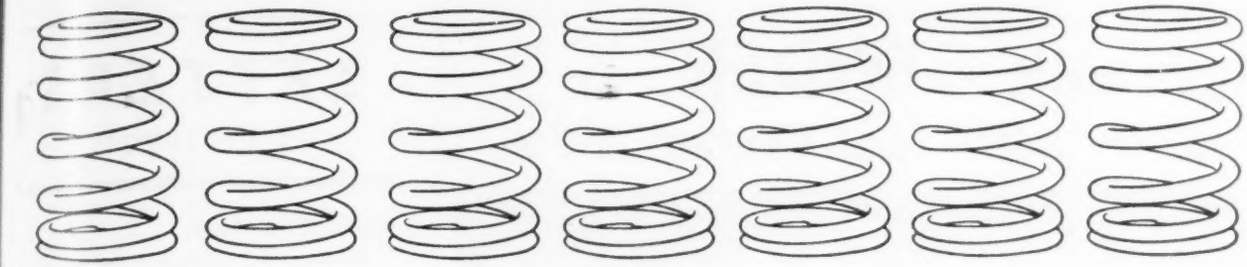
T. S. Bean of Barber & Ross Co. was the first in with the correct answer to the gambling problem of Nov. 13. The first man started with $39, the second with $21 and the third with $12.

A man and wife, each weighing 160 pounds, have two sons, each weighing 80 pounds. They want to cross a river in a boat that can carry no more than 160 pounds. How do they cross, and leave the boat on the farther side?

Shrdlu

(Editorial Index—page 19)

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.



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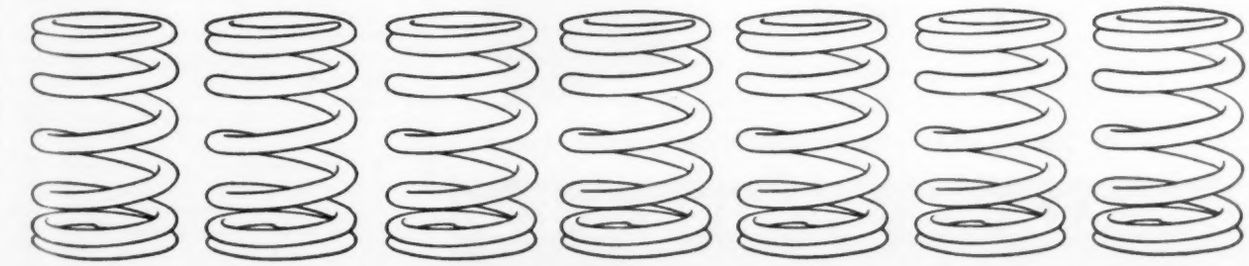

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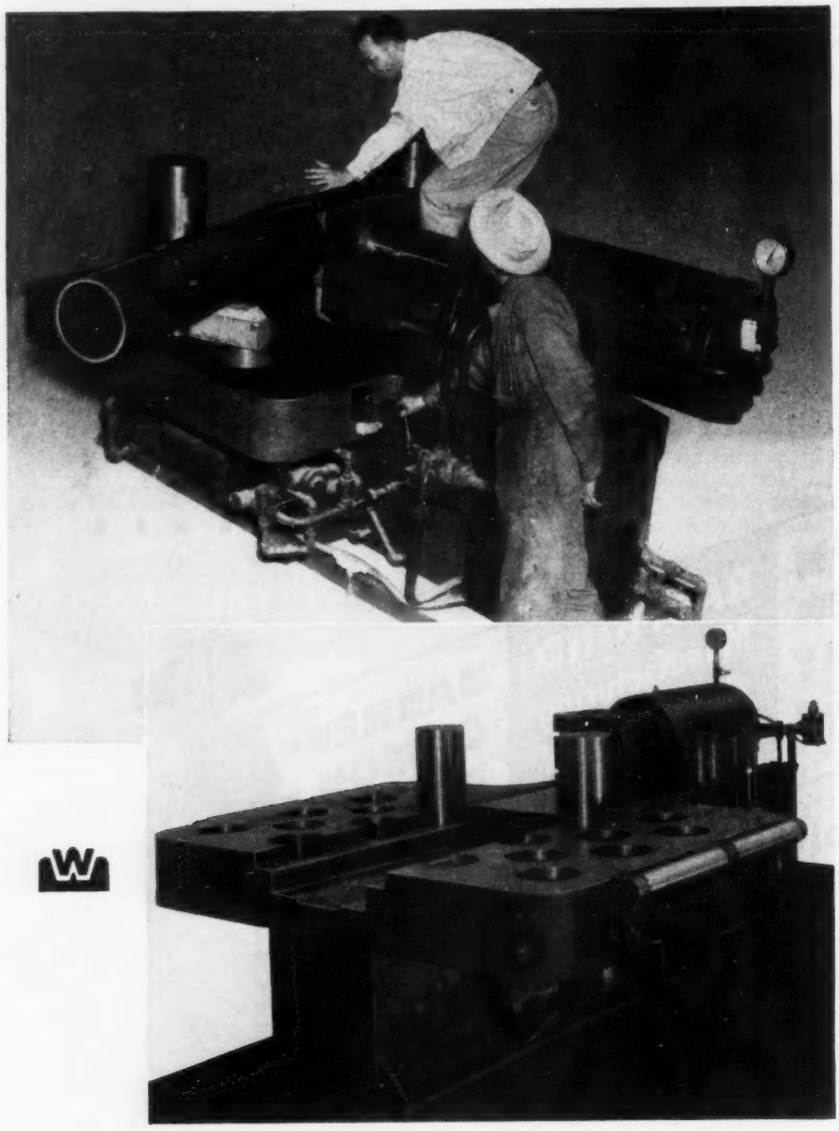

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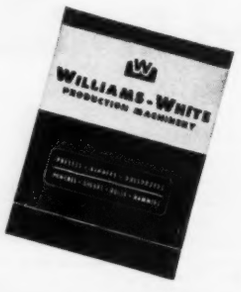

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LETTERS

TO THE EDITORS

Faster Than Fast

We here at Cro-Plate during the past three years time culminated a research and development program in which we have developed a high speed plating solution which deposits chromium at three times the rate claimed in the article, "Self-Regulating Chromium Bath Plates 20 to 80% Faster," in the Oct. 16, issue, page 98. In other words, we deposit it as high as 0.009-inch per hour. Our density is close to 75 per cent higher than conventional deposits, the hardness ranges between 79 and 82 Rockwell C and porosity is practically eliminated.

Theodore L. Brantly Jr., President
Cro-Plate Co. Inc., Hartford, Conn.

Fretz-Moon Shines Again

Certain tube societies, members of our association, are interested in cutoff equipment for tubes. One has to cut tubes of 1 inch OD, 150 feet long, into lengths of approximately 20 feet. The tubes leave the reducing gear at a speed which may attain 700 to 800 feet per minute. This manufacturer would like to install an adjustable flying saw mechanism on the exit line of the tubes. Please send more information on the Fretz-Moon equipment mentioned in your magazine of Sept. 18, page 113.

J. Bonnet, Association Technique de la Premiere Transformation, Paris France

● *The July 10, 1950, issue of* STEEL *had a detailed article on this installation, page 96. Also contact the manufacturer, Aetna-Standard Engineering Co., Youngstown 1, O.*

But Think What It Buys!

I am interested in a recent article in Survey of Current Business pointing up plans to increase steel producing facilities from 100.6 to 110 million tons. Can you give me any idea of the capital expenditures involved.

L. F. Church, Manager of Market Research
Emery Industries Inc., Cincinnati, O.

● *If the expansion were all new capacity, cost would be near $300 per ton. However, much of the increase will be achieved by enlarging and improving present facilities, this making the cost somewhat lower. The 5 million ton increase since the war cost the industry $2.5 billion dollars for improvement and expansion of facilities.*

Printed Circuits

We are interested in obtaining further information on improved methods of producing printed circuits. It was mentioned under Production and Engineering News at a Glance in the Oct. 9th issue.

L. Gleimer, Products Engineer
W. L. Maxson Corp., New York, N. Y.

● *Information on improved methods of producing printed circuits is available from Office of Technical Services, U. S. Department of Commerce, Washington, D. C. Ask for report No. PB100 950. Send check for $1.75 payable to treasurer of the United States.*

STEEL

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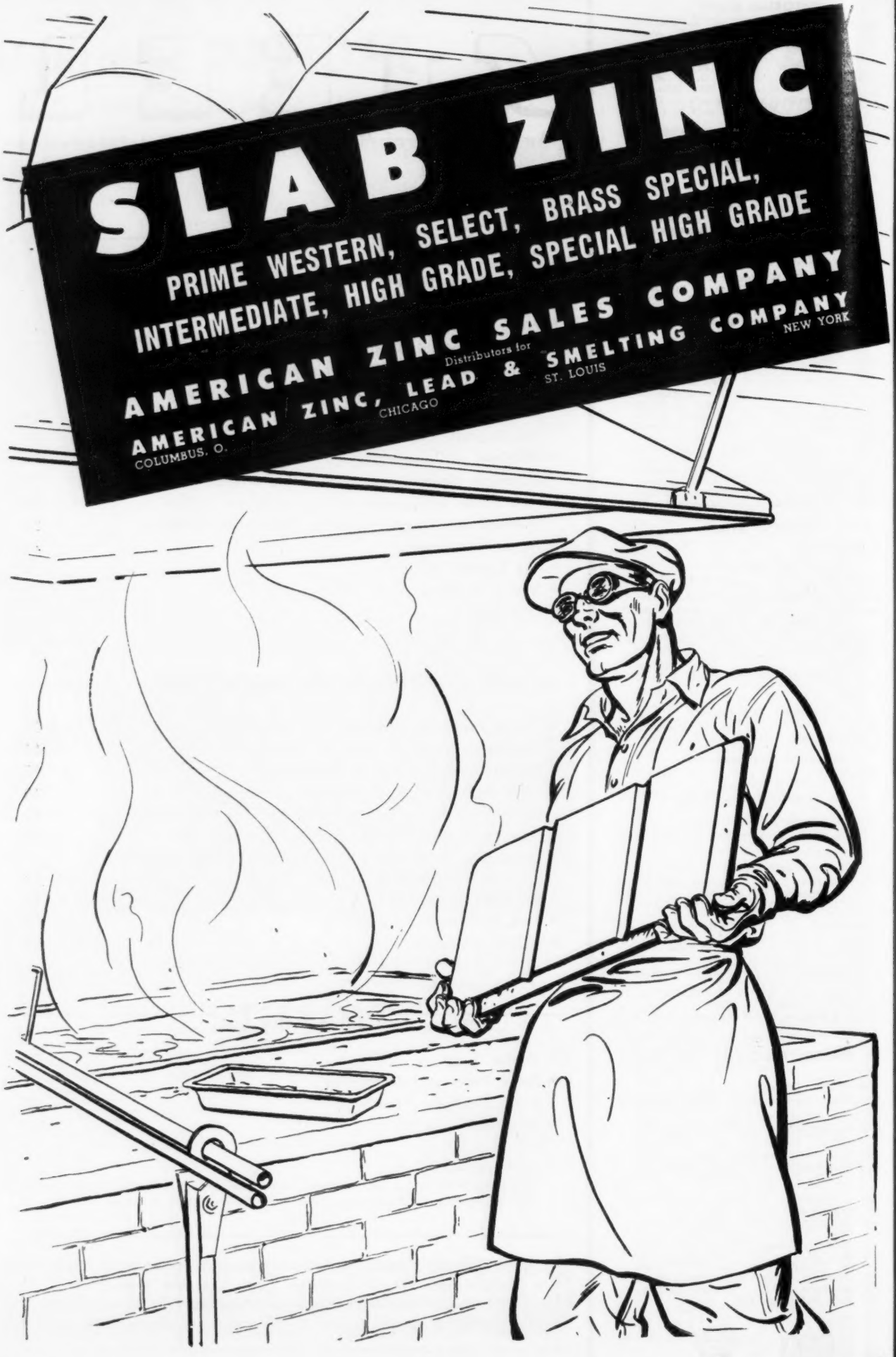
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November 27, 1950

More for Uncle Sam

In this issue eight authorities present their views on the timely subject of depreciation for tax purposes. Each approaches the subject from the angle of his principal interest and each has his individual idea as to how depreciation reform can be accomplished most effectively.

However, there are several points on which all of the experts are in complete accord. One is that the mere fact that the government has authorized the amortization of defense facilities in five years should not lull industrialists or others into complacency regarding the necessity of overhauling the depreciation policies on all equipment—whether it be for defense or ordinary peacetime use.

Throughout all eight discussions is the belief that Congress should take a stand on depreciation, on the reasoning that the Internal Revenue Department's attitude is influenced too much by the initial loss of tax revenue that would result from depreciation reform. The argument runs that if Congress could be convinced of the long-term gains in revenue that would result from depreciation reform, it is better able to take the responsibility for losses in revenue during the adjustment period than are officials of the Treasury Department.

Obviously the big problem is to "sell" our representatives in Washington on the idea that an intelligent and fair depreciation policy will make for a more efficient and profitable American industry and in the long run, much more revenue for Uncle Sam's treasury. —pp. 30-33

* * *

STUPENDOUS!: American industry is on the threshold of its greatest spurt of expansion in history. The amazing thing is that the motive comes not from the emergency of an all-out war but from the necessity of strengthening defenses for a war that may or may not develop. Supplementary to the preparedness angle is the fact that civilian needs are likely to exceed anything envisioned a few years ago.

This zest for increased capacity is particularly marked in the basic steel industry which, rightly or wrongly, has been accused of lethargy in responding to expanding demands of the nation for steel. Ever since the attack on Korea, steelmakers have been revising upward their plans for building new facilities.

Today the programs already announced call for such an unprecedented volume of construction to be completed in such a short time that one may seriously question whether or not the nation's engineering and construction talents and facilities—great and efficient as they have proved to be under the pressure of past emergencies—can be expanded rapidly enough to take on the extra burden.

That this question is not far-fetched is indicated by the fact that only a few top notch experts have any conception of what is involved in an increase of say 10 million tons of steel ingot capacity in a two-year period. How many critics know what this expansion means in terms of iron ore output, dock facilities, lake shipping, unloading docks, by-product coke ovens, blast furnaces, coal and limestone requirements, refractories, railroad transportation, etc.? How many know that 3 million tons of cast iron ingot molds are required to pour 100 million tons of steel ingots?

Some time, when the steel industry has passed from the present emergency, there will be a pe-

(OVER)

riod of short or long duration when the demand for steel may be considerably less than the supply. This will invoke sharp price competition. Because the low prices favor the most efficient producers, there will be wails from the high-cost companies. This will be reflected in oratory in Congress by men— now critics of steel's alleged reluctance to expand—who at the undesignated future date will viciously damn the steel industry for "over expansion."

* * *

INFLATION FACTOR HIGH: Indicative of the broad scope of industrial expansion is the estimate that expenditures for new plant and equipment next year will be $21.6 billion, an increase of 20 per cent. The increase will result mainly from extensive expansion in the steel, aluminum, electric power, petroleum, chemical, atomic energy and other industries closely allied to defense programs; from re-equipment of service industries, such as the railroads; and from the higher costs of equipment and construction.

This estimate of $21.6 billion compares with $18 billion in 1950, $19.2 billion in the peak year of 1948 and $5.2 billion in 1939. One feature of the gain in 1951 over 1950 that is disconcerting is the probability that half the increase can be attributed to higher costs and half to higher volume. If it is true that $1.8 billion is due to higher costs, that fact is a severe indictment of national policy. The inflation factor is too high for complacency. —p. 27

* * *

WITHOUT MANGANESE?: Bureau of Mines is working on a project which could turn out to be a dismal failure or a brilliant success. At its Albany, Ore., experiment station it is attempting to prove that red shortness in steel can be avoided without using manganese simply by cutting down on the sulphur content. Already the station has demonstrated that by using special melting methods, small heats of low-sulphur, low-manganese steel can be produced which has satisfactory forging characteristics. Sulphur is held to 0.001 per cent and the combined silicon, manganese, carbon, phosphorus and sulphur totals less than 0.008 per cent. The manganese trace comes from the ore. No manganese is charged in the furnace.

If steel with satisfactory rolling characteristics can be produced with a minimum of, or no manganese, that fact is worth knowing. It would solve an important and timely problem. —p. 34

* * *

NEED MERCHANT IRON: One phase of the current iron and steel expansion program calls for the construction of nine blast furnaces. When in operation these stacks will add 3.6 million tons to the nation's ironmaking capacity, bringing the total up to 75.2 million tons annually.

It will be noted that all of these projects are being undertaken by large integrated companies. The increased capacity will help considerably in solving their serious problem of metallics. However, as long as demand remains at high levels, very little if any of this increased tonnage of pig iron will be available for the smaller non-integrated cold metal shops or for many foundries.

Unconsciously, perhaps, we are drifting into a situation where the lack of sufficient "merchant" iron is going to cause a lot of headaches for an extended period. It is a problem that deserves more attention than has been given to it thus far in the present emergency. —p. 38

* * *

PLAN FOR MORE POWER: J. L. Wagner of Westinghouse Electric Corp. puts his finger on a timely subject when he states that "the trouble with many of today's industrial plants is that their wiring systems were never modernized to keep pace with increased heavy loads. As a result of this neglect, lighting levels today are lower than desirable and motors and other productive equipment are operating at greatly reduced efficiency."

This sounds as if many industrial plants are suffering from the same ailment as are old homes in which the electrical systems have not kept up with increased loads. One remedy suggested by Mr. Wagner is to install a bus duct system. Plan the system so that plug-in circuit protective devices can be easily installed or quickly shifted from place to place. Also plan not only for present load but also for additional capacity for future growth. Plan for receptacles at convenient intervals so that any reasonable power need can be supplied readily. —p. 59

E. C. Shane

EDITOR-IN-CHIEF

News Summary

GOING UP—Capital goods industries face a peak year in 1951. Expansion programs in steel, aluminum, chemicals, petroleum, rubber, defense and other industrial projects indicate a larger physical volume of plant and equipment purchases (p. 27). Combined with higher prices, the increase in volume points toward plant and equipment expenditures of about $21.6 billion, 20 per cent above this year. Contributing heavily to the increase will be the 10 million ton steel expansion program (p. 38) which now includes nine blast furnaces capable of producing 3.6 million tons of pig iron. Contrary to published reports, U. S. Steel has not yet placed contracts for construction of its $350 million Morrisville, Pa., plant. The aluminum industry (p. 28) is considering a 650 million pound expansion, plus the reactivation of standby plants.

CONTROLS—The materials situation grows tighter and will bring more strict controls. Alloy steel producers want nickel suppliers to be permitted to continue to allocate nickel on a voluntary basis (p. 29) . . .Zinc users hope distribution of that metal can be handled by direct NPA allocations rather than by limitations on consumption. NPA believes no direct allocations of zinc will be required in the first six months of 1951, but the shortage has required Inland Steel to curtail galvanized sheet output . . . Copper use in civilian products will be curtailed soon.

SLOWER PACE—Materials and manpower shortages are cutting output down from peaks recorded in the last few months. STEEL's industrial production index slipped to 203 as automotive assemblies fell more than 38,000 units (p. 44). Freight car deliveries won't reach the 10,000 per month pace as early as carbuilders hoped. The Federal Reserve Board asks banks to re-examine loans and hold them to rock bottom requirements. Machine tool orders moved a little higher in October for the second best monthly total since the war years.

BATTLE AHEAD—Capital goods makers in the U. S. will have a hard fight on their hands to recapture the Canadian market when the Dominion lifts its import restrictions (p. 37). British producers have made inroads into Canadian markets because of the restrictions and American manufacturers' preoccupation with domestic business and they won't readily give up a $27.3 million market.

TRICKS UP THE SLEEVE—Buyers, follow-up men and other specialists in the auto industry will again have the chance to prove their skill in getting materials when there seem to be none (p. 41). They've done it in the past so it's a good bet they won't fold under pressure this time. New Fords have less chrome on standard models but the deluxe versions have even more. A "hardtop" model, the Victoria, won't go into production until January. Colors available on the new models have the usual fancy names: Coral Flame red, Alpine blue, Sea Island green and Mexacalli maroon.

UNION SHOP—The United Steelworkers-CIO is winning its battle for the union shop. Wage earners in six Pittsburgh district mills gave the issue comfortable margins last week and there appears to be no great obstacle in the union's attempt to make the union shop virtually industry wide.

DEPRECIATION FORUM—Although the new federal tax provisions providing for five-year amortization of defense facilities help the depreciation situation, thorough-going reform is still needed (pp. 30-33). That's the consensus among eight students of the subject whom STEEL has invited to participate in a forum which climaxes a series of articles on re-equipment and depreciation matters that began last May. The forum indicates that there's more agreement than last May on what should be done for reform; still more unanimity of opinion is required.

HERE AND THERE—Don't hesitate to apply for fast amortization for that new plant, even though it is not tied in directly with the defense program (p. 27) . . . Exemption from antitrust prosecution is being extended members of industry advisory committees (p. 34) . . . The warehouse industry believes its steel order will have little effect on mill shipments to distributors (p. 29) . . . Bureau of Mines (p. 34) is experimenting on low-manganese and no-manganese steels.

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STEEL
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Plant, Equipment Outlays To Rise

Capital expenditures expected to increase 20 per cent to new peak. Higher prices and expansion programs in steel, aluminum, chemicals, oil and defense projects are causes

NEW plant and equipment expenditures next year will rise about 20 per cent to approximately $21.6 billion.

The increase will result from: 1. Higher construction costs and equipment prices; 2. huge expansion programs in steel, aluminum, electric power, petroleum, chemicals, atomic energy and other defense programs; 3. re-equipment of the service industries, such as the railroads.

Increases in these programs will be so large as to to more than offset anticipated declines in construction and equipment purchases for some of the soft goods industries which may be hit by restrictions on materials.

The outlay for capital equipment in 1951 will easily establish a new record. Expenditures for 1950 now are estimated at $18 billion, a figure that has been expanding steadily as the year progressed. Peak year for capital additions was 1948 when expenditures totaled $19.2 billion, nearly four times the prewar figure of $5.2 billion in 1939.

Steel Leads—Pacing the expansion program for next year will be the steel industry which is engaged in a 10 million ton expansion program (p. 38) to be completed by 1952. The total program may cost more than $3 billion.

The aluminum industry (p. 28) is contemplating a 650 million pound expansion program to be largely completed next year. This is estimated to cost nearly $1 billion. Standby aluminum and magnesium plants are to be reactivated early next year, requiring substantial equipment purchases. Other nonferrous metals will come in for an as yet unfigured expansion.

The electric power industry expects to expand capacity by 7 to 10 per cent in 1951.

Chemical industry expansions will rival those of the steel industry and expenditures will rise 25 to 30 per cent.

Petroleum industry is asking for a 20 per cent increase in steel tonnage for its operations next year, which, combined with cost increases, may mean a 30 per cent increase in expenditures.

Defense Needs Rise—National Production Authority has delegated authority for obtaining defense ratings of scarce materials to the Department of Defense, the Atomic Energy Commission and National Advisory Committee for Aeronautics. While the size of the construction and equipment programs of these agencies cannot yet be accurately estimated, they are likely to be large.

Defense production in many cases will utilize present plant but will require tremendous investments for equipment.

Backlogs Up—A glance at the new orders and backlogs of the capital equipment manufacturers gives a fair idea of what to expect in 1951.

Machine tool builders' backlogs are more than double what they were at the beginning of the year. Shipments are nearly double the January volume. New orders are three times as great as shipments and are the highest since the war.

Foundry equipment new orders currently are three times as large as at the beginning of the year. Shipments are up but backlogs have increased tremendously. Operations will be limited only by availability of materials and manpower.

Electrical machinery and equipment backlogs increased 50 per cent from January to September.

Freight car backlogs now total 122,000, against 19,000 in January. Diesel locomotives will roll from shops in larger numbers in 1951.

Inflation, Too—Equipment and construction prices have been moving upward steadily. Wage increases have been granted to large groups of workers, will be granted to others. Steel prices will rise soon after the increased costs of the steel wage increase and the higher costs of raw materials are reckoned.

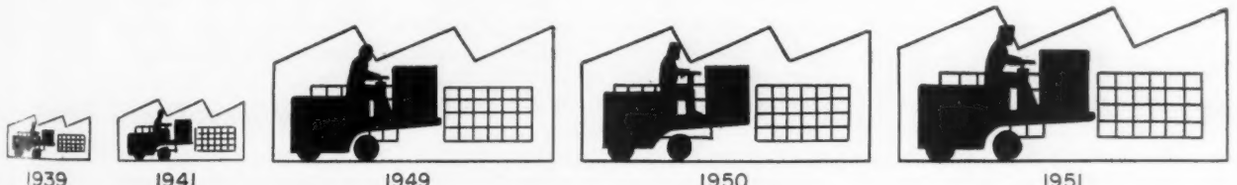
Next year's capital expenditures increase probably can be attributed in half to higher costs, in half to higher volume.

Try for Fast Depreciation

Companies not tied in directly with the defense program may get favorable consideration

MANUFACTURERS undertaking expansion programs—even if they are not directly related to the defense program—should fill out and file Form 140 with the National Security Resources Board. Copies of the forms may be obtained from NSRB or any Commerce Department field office. Under the prevailing philosophy adequate defense requires a sound, well-balanced economy—so that many expansions involving purely civilian products may be ruled as essential to defense, and hence entitled to fast amortization under the Defense Production Act. There will be no harm in trying.

How much accelerated depreciation should be allowed in the case of a plant—as a steel mill—which will not lose its usefulness after the rearmament period is over? Should amortization of such a plant be allowed in 5 years, as in the case of a strictly war plant, or should 5-year depreciation of, say, 50 per cent of the investment be allowed? Is it possible to write a clear definition as to the portion of a new plant that is a replacement, not entitled to fast amor-



1950 and 1951 figures estimated by STEEL

tization, and the portion that represents expansion and hence is entitled to the 5-year write-off? Answers to questions like these soon will be assembled into a set of regulations under which the NSRB will make fast-depreciation rulings on individual expansion programs.

Map Aluminum Expansion

Three producers may share in 650 million lb added capacity. Idle plants to be reactivated

ALUMINUM production capacity will be expanded by 650 million pounds annually if a program now being shaped up by the leading producers and the government is approved. The expansion, according to present plans would be shared by the three leading producers and would require about 18 months to build.

In addition, 440 million pounds of standby capacity would be reactivated within the next 5 to 7 months. The total additions would be 1090 million pounds. Added to present capacity of 1455 million pounds, the new and reactivated plants would bring total capacity to 2545 million pounds a year.

Shared by Three — The three established aluminum producers would divide the 650 million pounds new capacity this way: Aluminum Co. of America, 250 million pounds; Reynolds Metals Co., 200 million pounds; Kaiser Aluminum & Chemical Co., 200 million pounds.

The reactivated capacity would go to: Alcoa, 160 million pounds (all to be stockpiled); Kaiser, 160 million pounds; Reynolds, 40 million pounds; Harvey Machine Co., Los Angeles, 40 million pounds; Apex Smelting Co., Chicago, 40 million pounds.

Still in the exploratory stages are proposals for new aluminum facilities by Apex, Harvey and the National Aluminum Reduction Co.

How They Stack Up: Should the expansion and reactivation plans be executed as planned, the aluminum production picture would look like this:

	Million Lb
Alcoa	1150
Reynolds	690
Kaiser	625
Apex	40
Harvey	40
Total	2545

Nearly 5 Million Tons in '53

Armco Steel Corp. will have capacity of 4,810,000 net tons Jan. 1, 1953 when new construction and revamping of existing furnaces is completed, an increase of 1,107,000 tons compared with 3,793,000 tons July 1, 1950, reports Chairman Charles R. Hook.

Program includes 3 new open hearths at Middletown with capacity of 592,000 tons; 222,000 tons in additional capacity at Houston, including a 75-ton electric with annual rating of 150,000 tons; one new electric at Kansas City, also rated at 150,000 tons; revamping of present furnaces at Ashland to provide 47,000 tons; and a similar revamping at Butler to add 6000 tons.

NEA

BATTLEFIELD CONVEYOR: Two U.S. soldiers look at an electrically-operated conveyor system that North Koreans used for moving food supplies. It ran from east of Pungsan to the first reservoir west of Pungsan, a distance of 25 miles. Speaking at the Westinghouse Materials Handling conference in Buffalo, Harold Von Thaden, vice president and general manager of Robins Engineers Division of Hewitt-Robins Inc., said the belt conveyor is about to be used as a method of speeding up the flow of battlefield supplies (STEEL, Nov. 13, p. 76). Well, here's an adaptation, Mr. Von Thaden

$50-Million Expansion Surveyed

Granite City Steel Co. has under consideration a $50-million expansion program that will double its productive capacity. John N. Marshall, president, says the program would boost the company's output to more than 100,000 tons of ingots a month or over a million tons annually. In 1949 Granite City's output reached a record of 532,000 tons.

Present plans include the construction of additional open-hearth facilities, coke ovens, blooming mill, soaking pits, slab furnaces, scarfing dock and necessary complementary equipment. It will also include establishing extensive dock facilities at the new Granite City harbor on the Mississippi river Chain of Rocks canal.

Coverdale & Colpitts, engineering and research firm, is working on a survey and will report on the feasibility of the expansion.

Granite City two years ago completed a $26-million expansion program and at present has a $6-million program going that will be completed next year. The expansion increased the company's production from 35,000 to 60,000 tons per month.

Copperweld To Spend $1 Million

Copperweld Steel Co. is planning a major expansion and improvement program at its Warren, O., steel plant to boost its ingot capacity. The program will cost an estimated $1 million. The plant has a rated capacity of 450,000 tons of ingots. It was established just before World War II and has grown enormously since.

Areojet Finishing Addition

Aerojet Engineering Corp. is completing an additional 56,000 square feet of floor space to include a production machine shop and a physical sciences laboratory at its plant at Azusa, Calif. The new machine shop was made necessary by the accelerated rocket program carried on for the armed services by Aerojet, big manufacturer of rockets. The machine shop will house tools for manufacture of components for liquid and solid propellant rocket motors. The shop will accommodate 400 machinists per shift. Employment at present is 1600.

Porter-Cable Buys Johnson

Porter-Cable Machine Co., Syracuse, N. Y., bought Johnson Engineering & Sales Corp. of Rockford, Ill. Purpose of the move was to extend Porter-Cable's line of electric tools to provide a complete selection of portable woodworking machines. Johnson makes air-driven sanding machines used in the furniture and automotive industries. The sanders will become a part of Porter-Cable's Speedmatic line of electric tools which includes saws, abrasive belt sanders, routers, shapers, planes and lock mortisers, says De Alton J. Ridings, Porter-Cable president.

Arwood Opens Branch Plant

Arwood Precision Casting Corp., Brooklyn, N. Y., opened a New England branch plant at Groton, Conn., Rawson L. Wood, Arwood president, announces. The branch plant was

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equipped with new machinery designed by engineers of the parent company for precision investment casting of ferrous alloys. Operation of the plant will speed delivery of aircraft and instrument parts and nonmilitary items. The reason for the new plant is simple: Production facilities of Arwood's major Brooklyn plant have been taxed by a 262 per cent sales increase for the first nine months of 1950 over the same period in 1949.

Zurbach Gets Plant Site

Zurbach Steel Co. of California Inc., Los Angeles, acquired a 2½-acre industrial site from Union Pacific Railroad for offices and a warehouse. Served by an enclosed railroad siding of UP, the plant will have overhead crane facilities for rapid handling of products distributed by the company. Products include flat rolled steel, sheet, strip and coils. A new shear line will be installed and facilities for leveling and processing sheet and coil stock will be added.

Steel Export Quotas Unlikely

With November almost over, there is little chance fourth quarter export quotas for iron and steel products will be set. If anything happens it will be in the direction of tighter export controls. Products not now under control—tin plate wasters, black plate and cold-rolled sheet rejects—may be added to the positive list of commodities which may be shipped only under validated export licenses. Since Oct. 1 when 39 steel products were added to the positive list, the Office of International Trade has been passing on export steel applications on a case-by-case basis. Current exports are taking less than 3 per cent of steel output.

Licenses are not needed for shipment to Canada.

Increased Lead Time Asked

Longer lead time in mill scheduling and an increased number of DO orders for alloy and stainless steel are being sought by producers of these steels. The producers last week endorsed a proposed amendment to the National Production Authority's steel order (M-1) to provide these steps.

David B. Carson, director of the NPA Iron & Steel Division, said that NPA recognized the 45-day lead time might not be adequate, but that the original order had to be issued to take care of immediate defense needs. NPA authorities indicate the new amendment will specify products and the percentage of total production affected.

NPA has been considering an order on the use of nickel. The alloy producers, agreeing that nickel is in extremely tight supply, suggested that it should continue to be allocated voluntarily by the nickel suppliers rather than brought under NPA control. The group is considering various ways of conserving the nickel supply by using substitute metals and by increasing the use of scrap nickel. Alloy steel producers were warned that a number of defense support-programs, such as high-octane gasoline, rubber and power, will take larger tonnages of their output.

MOBILOADER. Sage Equipment Co., Buffalo, developed this new cargo loading device to handle all types of air and industrial cargo. The mobile unit consists of a 21-foot conveyor belt mounted on a standard Dodge chassis. The conveyor can be raised or lowered from 5½ feet to 11 feet. Belt is a rubberized material; its direction can be controlled by a lever at either end. Its concentrated load capacity is 500 pounds, distributed load capacity 1500 pounds

M-6 To Have Little Effect on Warehouse Volume

THE WAREHOUSE steel order (NPA Order M-6) will have little influence on the volume of mill shipments to distributors. This is the appraisal of Walter S. Doxsey, president, American Steel Warehouse Association.

Mr. Doxsey points out that DO (defense order) and delegated tonnages may take only 15 per cent of total steel production, but the product mix will not be uniform. The proportion of rated sheet and plate orders is far above the average.

Defense and support program steel comes first—before shipments to warehouses or civilian consumers.

Producers Given Latitude—Another important factor in the determination of steel tonnages to be shipped to warehouses, says Mr. Doxsey, is the latitude given each producer in the distribution of its free steel. "Order M-6 states that the mills shall endeavor to ship unfilled orders from warehouses by the middle of February. NPA expects them to do just that, and the mills were in accord with this provision when it was written into Order M-6. This order establishes a minimum for shipments to warehouses; it does not set a maximum.

It provides that mills shall recognize, and correct, if possible. abnormalities that occurred in shipments to warehouses during the base period.

Rough Index—"Judged from these angles, the formula which relates the steel shipped to warehouses during the first nine months of 1950 to the free steel any mill has to offer is not of great significance. It simply is a rough index to be used by producers in approaching the tonnages of steel to be allotted to their warehouse customers.

"NPA expects warehouses in turn to co-operate by giving the Defense Department and industries having essential defense contracts first call on their stocks for warehouse-size quantities of scarce items. Order M-6 affords protection against exorbitant demands from these quarters. And it follows that remaining items should be distributed equitably among civilian customers.

"Shipments of mill-size orders from warehouse stocks will incur disfavor of producers, bring additional and irksome regulations from NPA."

Still Needed:

Depreciation Reform

You can amortize defense facilities in five years, but thorough tax depreciation reform is yet necessary. That's the consensus among eight students of the subject whom STEEL has invited to participate in this forum which climaxes a series of articles on the matter running May 8, June 19, July 31, Aug. 21 and Oct. 9. Industrialists say, "Act now for reform: The 82nd Congress will be favorable to business; a top industrial plant is vital for America."

Depreciation by Expediency

By W. P. Witherow
Chairman & President, Blaw-Knox Co.

THE 1950 Revenue Act, in providing for five year amortization of defense facilities, recognizes the incentive principle which is inherent in our capitalistic economy. In that respect it is sound and, therefore, will accomplish to some extent the results desired.

The soundness of this provision, however, does not alter the fact that its enactment is an expedient to correct a situation which might not have existed except for the unsoundness of the traditional tax treatment of depreciation.

The effect of the customary tax treatment on replacement of physical assets cannot but be detrimental to business as well as to the Treasury. Business suffers by continuing to use machinery after it should be scrapped. The Treasury suffers from lower revenues from a retarded economy.

It is self-evident that the strength of our country is directly related to its productive efficiency. It follows, then, that the depreciation policy which will stimulate to the greatest extent the replacement of obsolete and inefficient equipment will in the long run bring the best results to the government as well as to the employees, the stockholders and the country at large.

Two difficulties stand in the way.

First is the temporary loss of revenue which the Treasury would experience, unless the loss were made up in some other way, until a new depreciation policy had become fully effective. Since plant assets are the least flexible of all the business assets with which management has to deal, some years would pass before the full effect of a sound depreciation policy could be achieved.

Expediency helps to perpetuate a mistake made in 1934 when expediency caused the establishment of greater rigidity in tax depreciation policy. Every year which is permitted to pass before a correction by Congress will extend the length of the adjustment period required to obtain the full effect of a changed policy.

The second difficulty arises from the apparent inability of management, accountants and government to agree upon a practical method of correcting a condition which they all realize is detrimental to the economy.

The straight-line method, which seems to level out the cost of using equipment, actually forces gradually rising costs. This is true because repair and maintenance costs rise as the asset grows older. The declining balance method charges less and less depreciation as repairs increase and tends to level out the cost of using each unit. It has the added advantage of building up much higher depreciation reserves in the early years of usage.

It seems to me that a step in the right direction could be taken if Congress would permit, and taxpayers would then adopt, the declining balance method without the limitation (not more than 150 per cent of the straight-line rate) now imposed by the Treasury. Certainly something should be done promptly to correct the situation. In the absence of agreement on some better plan, I think repeal of the above 150 per cent rule would help considerably.

Tax Policies Brake Modernization

By Tell Berna General Manager, National Machine Tool Builders' Assoc.

ONCE again the industries of the United States muster their resources for a tremendous defense effort. They must meet this increased requirement with plants that contain 379,000 obsolete machine tools.

In my opinion, the greatest single factor contributing to the obsolescence of America's metalworking plants is the Internal Revenue Department's ruling that depreciation must be spread over the "useful" life of the machine—which, for tax purposes, is presumed to extend over some 20 years.

Even if it were not for inflation, this ruling would make it impossible for the manufacturer to recover the cost of a machine, tax-free, before it becomes obsolete, for the design of a machine is obsolete long before a 20-year period has gone by.

Just to make a bad matter worse, the dollar has been steadily declining in value; the depreciation deficiency is multiplied to such a point that in most cases a major share of the cost of replacement must come out of earnings after taxes. Ever since the war, this has acted as a consistent brake upon modernization.

The extent to which America's metalworking plants had run down since the war was evidenced by the flood of orders for new machine tools which materialized upon the entry of the United Nations forces into Korea. This did not represent war business; but the very thought that there might be a war production program stirred manufacturers to immediate action on behalf of replacement of machines which had long been earmarked as obsolete.

The deterioration of equipment caused by this tax policy has repeatedly been called to the attention of Congress. No constructive action has as yet been forthcom-

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ing, chiefly because any relief from present policy might involve a *current* decline in volume of taxes collected. When it is pointed out that if companies are permitted higher deductions today, the result will be higher taxable incomes tomorrow, the answer is, "The Government can't wait until tomorrow; it must have every available dollar today."

On top of this tangle there has now been superimposed the military production program providing for five-year amortization of emergency facilities, or such *portion* thereof as may be used for the emergency.

This poses a further dilemma. What *portion* of a machine tool is used for the emergency? The emergency may last five years, and the machine tool may be used for 15 years. Is one-third of the cost of the machine tool to be amortized on a five-year basis and the balance over a 20-year basis?

The question presented by such well-nigh insoluble problems points inevitably toward what I believe to be the only constructive solution of the whole situation—a new law in which Congress, not the Internal Revenue Department, will spell out depreciation regulations, and which will be based upon elective depreciation.

Of course some restrictions should be retained. A company should not be permitted to equip a new plant with new machine tools and write off the entire cost thereof in a single year. But suppose a company could elect whether it chose to spread depreciation upon a new machine tool over a period anywhere from five to twenty years. In the first place, this would in itself take care of special emergency amortization. But by no means all companies would choose to write off new equipment in as brief a period as five years. The decision would depend upon the nature of a company's business, its financial situation, etc. It would provide a flexibility which would contribute immediately to modernization instead of retardng it, and thereby lead, in the long run, to greater earnings and larger taxable incomes.

It is important that special amortization of emergency facilities should not be permitted to sidetrack efforts to obtain a constructive long term depreciation policy in this country. They are both parts of the same picture and should be considered together. If this country is to have the production strength required for the job ahead, its metalworking equipment must be brought up to a proper standard of performance. This can be accomplished, in my opinion, only by some measure of elective depreciation.

Formula for Reform

By H. M. Harper
President, H. M. Harper Co.

ONE DRAWBACK in the Revenue Department's Bulletin F is the requirement that the same depreciation must be charged on machines and buildings whether they're two or twenty years old. The largest depreciation should come out of machines and buildings when they're newest.

All equipment and buildings have about three periods of value—when they're nearly new, middle aged and old. The nearly new basis would be about the first 30 per cent of life, or the first six years on a machine with a 20-year life. The second period would be the second 30 per cent of its useful life, or from six to twelve years. The old age period would be the remaining 40 per cent or eight years.

A machine with a twenty year estimated maximum life would have reduced value, wear and obsolescence factor of 60 per cent during the first period; 30 per cent in the second period, and 10 per cent in the final period, which we can foreshorten into the "60-30-10" formula based on a life of "30-30-40."

If industry could use the Treasury's formula for age but apply realistic percentage factors to it, that might be the answer. Under the "60-30-10" formula, figure the dollar depreciation charge per year by first calculating it on a straight, conventional basis. Double that for the first period, leave it the same for the second and use one fourth as much for the third. A $2000 machine to be depreciated over 20 years would be amortized at the rate of $200 a year for the first six years, $100 a year for the second six years and $25 a year for the last eight years.

The resale value, considering the market to be reasonably steady, of a five year old machine tool is probably about half its cost with an average degree of luck and timing. Under theo "60-30-10" formula, our $2000 machine depreciates to $1000 after five years.

The writer feels that few in management would hesitate to go ahead with equipment with a formula of this kind approved. While it is not as generous as a Certificate of Necessity, and not necessarily intended to cover that which should go on a Certificate of Necessity, it leaves a safe, workable formula for industry to apply to all types of fixed assets.

Safeguard Against Capital Erosion

By H. T. McAnly
Resident Partner, Ernst & Ernst

THE continuation of traditional accounting practice with respect to depreciation is resulting in impairment of the capital of the companies which employ it.

A dollar is worth what it will buy. Today, it will buy only one-half of what it did ten years ago.

Suppose in 1940 a company bought a battery of 20 machine tools for $100,000. By 1950, it has recovered, through traditional depreciation practice, $50,000. But has it recovered one-half of the cost of replacement? Certainly not. During the ten years the dollar has been declining; the last of the dollars are worth only fifty cents.

Obviously there is a depreciation deficiency.

Traditional accounting does not recognize that deficiency. The results are dangerous.

If a company takes on its books only the depreciation allowed by the government, it is overstating its earnings by the extent of its depreciation deficiency. This gives Labor and Government an inflated idea of profits and paves the way for more wage and tax demands.

If a company pays out in dividends a major portion of earnings as reported, it is giving away part of its needed capital.

Perhaps the worst feature of all is that under our present tax laws, which make no allowance for the decline of the dollar with reference to depreciation provisions, a company has to pay federal income tax upon a portion of so-called earnings that are not actually earned and never will be realized.

The crux of the matter lies in our present tax laws as interpreted and enforced by the Internal Revenue Department. Relief lies only in Congress. But how can we expect Congress to understand this situation and grant relief as long as industry, in its own accounting practice, fails to give any recognition to the actual facts?

My claim is that regardless of reports made to the Government for tax purposes, our reports to stockholders, employees and the public should be made on a realistic basis. Unless we do that, I don't see how we can expect

Congress to pay attention to our depreciation dilemma.

How can we achieve realistic financial reporting? It is not difficult from an accounting standpoint, provided we have an index of the value of the dollars—an index that could be figured by using the obverse of averaged government price indexes.

An application of this index to the $100,000 purchase of 20 machine tools in 1940 would show the depreciation deficiency accumulated to date. This process can be repeated with all equipment purchased in past years.

The total accumulated depreciation deficiency to date can then be set up in the balance sheet as a "reserve to prevent impairment of capital covering accumulated depreciation"—the amount thereof being deducted from surplus.

Each year, in the income account, the additional depreciation deficiency for the year can be figured by applying the difference between the current dollar index and dollar index applicable to the years of acquisition of the assets covered by the provision. The total should be labeled "depreciation deficiency", deducted in the income account, reducing reported earnings to that extent, and then carried over into the balance sheet and added to the "reserve to prevent impairment of capital".

I am convinced that only by some method such as this will industry be able to guard itself against impairment of capital and secure necessary congressional support for remedial measures. If a depreciation deficiency allowance becomes a standard item in company reports, there's hope that eventually it will be allowed as deductible.

Wring the Water out of Dollars

By Percival F. Brundage
Price, Waterhouse & Co.

THE continuing increase in the cost of plant facilities has made a re-examination of previous depreciation policies desirable by all businesses. Accountants have generally taken the position that since the cost of ultimate replacement is not ascertainable, and whether or not exact replacement will ever take place is uncertain, provisions should be based on actual cost rather than estimated replacement cost. But this does not prevent the computation from being based on cost and then convertcd into present dollars like the other elements of the income statement.

A satisfactory measure of the value of the dollar for a long period of years is already available in the B.L.S. Consumers' Price Index. By analyzing the plant account by years of acquisition or construction, as indicated in STEEL, June 19, and computing the depreciation provision separately by years, it is quite possible both to arrive at depreciation on cost and to compute the amount in terms of present dollars by applying the indexes for the respective years of acquisition and the current year.

In total this would give depreciation on historical cost and also in current dollars, both of which are significant figures. In my opinion, the current figure should be used for financial statements as supplemental to the cost figure and it should also be allowable for tax purposes. It is not necessary or desirable in my opinion to go beyond this and to convert the total cost of plant or the accumulated depreciation reserve to current dollars.

It will not be easy to persuade the Treasury or Congress to accept depreciation in terms of present dollars because of the fear that more than 100 per cent of cost may thus be allowed. But the difficulty really goes deeper than this. What industries will be most affected? Obviously, the industries which have the largest investment in plant that is expected to be useful for many years—the railroads, the public utilities, the heavy industries, like steel, and shipping.

The light industries, which purchase semifinished steel and other raw materials, are more interested in inventory problems. They have a wide choice of inventory methods, both for accounting and tax purposes. The alternatives include "lifo" which enables them to make charges against revenue on the basis of current prices, not prices paid in the past when the price level was lower. To them depreciation is relatively unimportant.

When Government is taking nearly half of reported profits, and assuming none of the risks to which capital invested in facilities for the safety of the country is subject, it should allow a reasonably prudent view to be taken of what may safely be called profit. This was recognized during the war in such measures as those which permitted wartime amortization of facilities. The same spirit should be applied to depreciation accounting in heavy industries.

Five-Year Amortization for All

By W. F. Burke
Comptroller, Scovill Mfg. Co.

THE NEED of facilities for the production of armaments led to the inclusion in the Revenue Act of 1950 of a provision to allow their cost to be amortized for tax purposes over a five-year period. This is depreciation reform and it will encourage the building up of defense facilities. It will also build up a mountain of papers and reports, but more serious to the economy will be the waste of millions of man hours spent accumulating data for filling out forms and debating the meaning of the law and its regulations.

The law is also discriminatory. If a five-year amortization plan is granted to producers of war goods, it should also be granted to producers of civilian goods. Even during wars civilian goods are necessary; it is important that facilities be employed in their production that save manpower and strategic raw materials.

If the law were amended to allow five-year amortization of all new facilities (land and buildings excepted) there would be no need for certificates of necessity, but then taxpayers would have to choose between five-year amortization and their present depreciation policies, which in many cases are based on Bulletin "F". The gap between the two is far too wide. Acknowledging that the Bureau of Internal Revenue has contributed greatly to the improvement of accounting practices, Bulletin "F" has been of dubious value. It is directed toward a limited objective and has failed in its comprehension of an economy geared to maximum production. Taxpayers should be given more latitude in selecting depreciation rates and should be allowed to vary them to meet changing conditions.

Closely allied with this problem is the question of what to capitalize and what not to capitalize. There has been a tendency on the part of the Bureau to insist on the capitalization of repairs and minor improvements and their amortization over a period of years. Controversy on such matters can never be avoided as the value of such expenditures is very difficult to measure, but I can see no great harm in leaving the decision wholly

in the hands of the taxpayer.

Much has been said about the unfairness of depreciation allowances on facilities acquired when the dollar was worth more than it is today. I agree that taxable income as now calculated is higher than economic income, but I prefer to keep the rule that depreciation allowances for income tax purposes be limited to original cost. Granted it is unfair, inflation is unfair to many in varying degrees. In the long run total taxes will be about the same either way. There is some slight relief in allowing greater depreciation of new facilities in periods closely following acquisition.

The timing of depreciation reform is important. A sudden burst of buying of new machinery might create more inflation and thereby do more harm than good. A proper balance must be maintained between the building of new plant and the production of consumable goods. Here priorities, the money market and other restraints should act as regulating influences. I believe that reforms along the lines suggested here will benefit all and in the long run will produce more tax revenue from taxpayers better able to pay.

By Your Own Bootstraps

By Claude K. Swafford
Vice President, Gisholt Machine Co.

WITH the traditional "feast or famine" of the machine tool industry it has always been a difficult problem to keep timed with the ups and downs a consistent re-equipment program. Ten or eleven years ago it was necessary to expand all facilities here and operate around the clock seven days per week in order to supply the number of machine tools required by the all-out war effort.

By the end of 1943, the excess demand for machinery was satisfied to a point where it was possible to devote part of our production capacity to more direct war materials and this was done.

After the war ended we dropped our third shift and reduced our working schedules to 40 hours per week and geared our production force to the lowered sales demand. These moves left us with a considerable number of idle machines. Many of the older items were scrapped and those with remaining usefulness were sold. In making these selections, the year of manufacture and the number of hours of usage were considered with particular attention to the latter, because some machines were used only part time in balancing production needs.

Based on this study of our own machines, the newer or least used machines replaced the older equipment, which was scrapped or put up for sale. In this way we reduced the average age of our overall equipment by 50 per cent and reduced total investment to only the minimum quantity of machine tools necessary to meet our anticipated production. Even then we were constantly making purchases from our total allowed depreciation reserve fund.

Prior to Korea, business began to show an upturn. We then made additional purchases for the expansion of our facilities, rather than for replacement itself.

During the summer of 1950 we developed our own "Equipment Replacement Analysis", based on a formula worked out by Machinery & Allied Products Institute. This was developed as a service to industry to call attention to the tremendous amount of obsolete machinery now in use in industrial plants of all kinds. This has received industry-wide publicity and created a great deal of attention, in spite of the situation which has developed since Korea. The formula is now being used in the selection of our own replacement equipment.

Another Complication: State Laws

By Norman H. Russick
Attorney-at-Law, Cleveland

NO DISCUSSION on depreciation is complete without considering depreciation permitted by the various states. The Internal Revenue Law and Bulletin "F" are the basis of depreciation allowed on the federal return, but such depreciation deduction may not be permitted by some states. There is growing agitation to permit taxpayers greater discretion in determining depreciation allowances, but until the states recognize similar methods much of the savings resulting from changes in the Federal law would be lost.

The laws of each state vary as do the regulations promulgated by their tax commissions. Ohio, for example, has promulgated Rule 279. This rule imposes upon taxpayers, whose depreciation exceeds sixty per cent of the cost of the asset, rates of depreciation which have little relationship to those prescribed by Bulletin "F". In order for a corporate taxpayer in Ohio to determine the net book value of property both within and without Ohio for the Ohio personal property return and the Ohio franchise tax Return, he must calculate the annual depreciation of buildings and machinery and equipment in accordance with Rule 279. This necessitates additional clerical work and maintenance of a second set of property records, unless the taxpayer is willing to compute the net value at not less than forty per cent of the cost of the asset.

Taxpayers in Ohio having buildings, machinery and equipment which were subject to the sixty-month accelerated amortization, permitted by the federal law during the early 1940s, are required to restore the cost of such assets and compute depreciation on these assets at rates prescribed by Rule 279. The result of this is to decrease the deduction claimed on the taxpayer's books and to restore to his asset account a computed fictional value. The net worth of a taxpayer is likewise increased by this difference resulting in increased taxes. This Rule also applies to property located outside of Ohio, should the taxpayer have buildings, machinery or equipment outside of Ohio. The apportionment factor in such cases will also be changed. However, proper tax treatment and maintenance of records can effect savings for Ohio taxpayers on their personal property and franchise tax returns.

Corporations doing business in New Jersey have been faced with a similar problem in connection with assets subject to sixty-month accelerated amortization. New Jersey has requested such taxpayers to determine the actual value of such assets as of the close of the year upon which the return is made. No taxpayer is likely to over-value such assets, but what basis can be used that will not be a controversial one? In several instances the state has taken exception to the values set by taxpayers and has requested additional data or has made an arbitrary valuation of its own.

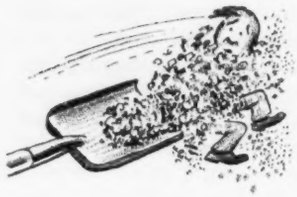
During the early 1940s many states did not enact laws or recognize by regulations the accelerated amortization provisions of the federal law. A review of the state franchise and income tax laws should be made for each state in which the taxpayer is engaged in business.

Windows of Washington

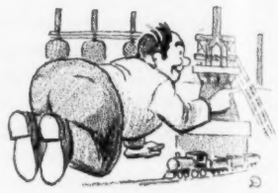
By E. C. KREUTZBERG *Washington Editor, STEEL*

Unshackled Industry Advisers

Small Business Gets Share



Eliminate Manganese



Pint-Sized Steel Plant

Members of industry advisory committees can breathe a little easier now . . . Small business will get consideration in the rearmament program

IF YOU'RE a member of an industry advisory committee of the National Production Authority or any of any other agency set up under the Defense Production Act, you'll be exempt from prosecution under the antitrust laws as long as you keep your nose clean. You are in the clear when you attend meetings called by the government, presided over by a government employee, enter into agreements at the request of the government and, in general, comply with orders of the government. You'll get in trouble, though, if you enter agreements with others in your industry independently. The Justice Department is prepared to extend exemption to industry committees that carry out an allocation task or enter into some other agreement at the specific request of the NPA administrator; in such cases the plan must be approved in advance by the attorney general. NPA is taking steps to acquaint its various industry advisory committees with the details of the Justice Department's ruling.

Small Business' Welfare . . .

To insure full consideration for the welfare of small business in the expanding rearmament program, the National Security Resources Board created in its Production Office a Small Business Planning unit. In charge is B. K. Slaughter, transferred from the Commerce Department to fill this new berth. Mr. Slaughter has had wide experience in the government in relation to small business, first with the Smaller War Plants Corp. and subsequently with the Commerce Department.

Steel Without Manganese? . . .

Can steel with satisfactory rolling characteristics be produced with a minimum manganese content—or without any manganese at all? That is an important defense problem on which the Bureau of Mines is working at its Albany, Ore., experiment station. If results are as hoped, present fears of a manganese shortage will prove groundless. The bureau wants to show that red shortness can be avoided without using manganese simply by cutting down on the sulphur content. Satisfactory forging characteristics already have been demonstrated with small heats of low-sulphur, low-manganese content. Using special melting methods, the bureau produced this steel with sulphur content of 0.001 per cent and with the sum of the silicon, manganese, carbon, phosphorus and sulphur less than 0.008 per cent. The manganese trace came from the ore as no manganese was charged in the furnace. Rolling characteristics of such material are to be studied later on with a laboratory-size rolling mill to be built and installed by the United Engineering & Foundry Co.

On a Laboratory Scale . . .

"A complete steel plant on a laboratory scale." That's how Dr. E. A. Gaugler, chief, Magnetics Division, Naval Ordnance Laboratory, White Oak, Md., describes facilities he is installing in a fine new building. Its purpose is to design and work out production methods for magnetic amplifiers to be made by the Magnetics Division or by outside contractors. Raw materials will be nickel, iron and cobalt, and the plant will be complete with melting, rolling and heat treating equipment.

Most notable unit will be a small Sendzimir planetary mill built by Waterbury Farrel Foundry & Machine Co., the second such mill to be made. In one pass it will reduce a 1-inch slab to 0.03-inch, thus avoiding contamination incident to repeated heatings. Material in this mill is rolled under high compression, making for greater strength in the finished product.

The cold-rolling unit will be another small Senzimir mill, also built by Waterbury Farrel, capable of rolling 100 to 200 pounds of thin strip, depending on gage, per 8-hour day. Melting under controlled conditions will be done in high-vacuum induction furnaces and in controlled-atmosphere furnaces.

MacArthur's SCAP . . .

Ferrous scrap again is going from the United States to Japan—but not in the quantities which led to congressional investigations after Pearl Harbor. A license validated by the Office of International Trade permits 1000 tons to be exported to Japan. Application for the license had the OK of General MacArthur's SCAP.

Interested in Foreign Trade . . .

Companies interested in foreign trade will soon have available the first of a series of booklets telling how to do business with the so-called "underdeveloped countries." They will tell about business laws and customs, import barriers, exchange rates, policy toward importers and foreign investors, business opportunities, etc., and the type of treaty in force with the United States. First booklets will deal with Turkey and Liberia, and will be followed soon by others on Indochina, Siam, Korea, the Philippines and, later, on the various Latin American countries.

The booklets will describe a method employed to great advantage by some leading American companies.

'Chromium' Preprint . . .

Now available from the Superintendent of Documents, Government Printing Office, Washington 25, at 5 cents per copy, is a preprint of the "Chromium" chapter of the Bureau of Mines Minerals Yearbook for 1949. Specially valuable features are the statistics showing domestic production, imports and prices.

Canadian Heavy Goods Markets Go British

Canada's shortage of U. S. dollars gives an impetus to British capital goods sales that have soared to an annual rate of $27.3 million, an alltime high

AMERICAN capital goods producers will have a battle to regain Canadian markets when the Dominion lifts its import restrictions on U. S. equipment, probably next Jan. 2.

British capital goods manufacturers have made inroads into the Canadian markets because of the restrictions and because of American producers' preoccupation with domestic business.

New Peak—British exports of capital equipment to Canada have soared to an annual rate this year of $27.3 million, an alltime high. Growth in the United Kingdom capital goods industry is indicated in the increase in the number of machine tool manufacturers from 123 in 1935 to about 260 in 1949. Physical output is now about 20 per cent above prewar. Employment has jumped from 26,000 in 1935 to about 40,000 now, estimates the National Machine Tool Builders' Association, Cleveland. Total U. K. exports of machine tools are now probably 20 per cent above the prewar level.

Canada's curbs on capital goods imports will be lifted at U. S. request, made when the Canada-U. S. industrial mobilization pact was signed in Washington early in November. The actual date for removal of restrictions hasn't been set, but it probably will be Jan. 2, the same day on which remaining restrictions on consumer goods imports will be withdrawn. But capital goods controls may be continued until Mar. 31 to give Canada's Trade Department more time to reorganize the capital goods control branch and possibly turn it into a priorities division. Such a division would be linked with its counterpart in the U. S. to deal with allocations and priorities of materials needed in defense production.

U.K. Textile Machinery Sales Up

Leading the pack in Britain's capital goods equipment sales to North America is textile machinery. Exports to the U. S. are higher than to Canada and represent one-third of all British machinery sales in the United States.

Boosting U. K. exports in coming months will be the greater availability of steel in the islands. The new No. 2 furnace of the Steel Co. of Wales, at Margan, was just blown in. The unit, having a hearth diameter of 25 feet, 9 inches, is the largest in Great Britain and is rated to produce 1000 tons of basic iron per day. It is one of a group of facilities that will supply hot metal to the steel plant at the Abbey works where the largest hot strip mill in Europe is now being installed.

Not Accepting U.S. Orders

West German steel producers have order backlogs up to their chins and are no longer accepting business from the U. S. Capital equipment makers have a little idle capacity, but they have never had much dealing with the U. S. Many of their overseas contracts are now with Australian, Indonesian, Pakistanian and Indian buyers.

Exporters are worried about rising steel prices. German coal prices will rise, and this will boost coke quotations by $1.20 to $1.44 per ton. Iron and steel scrap has jumped 15 per cent in cost, as will Swedish iron ore in January. All that means rolling mill product prices must go up at least $2.85 per ton soon. That, incidentally, will remove the price differential between German and French steel and will help overcome one stumbling block in negotiations on the Schuman plan.

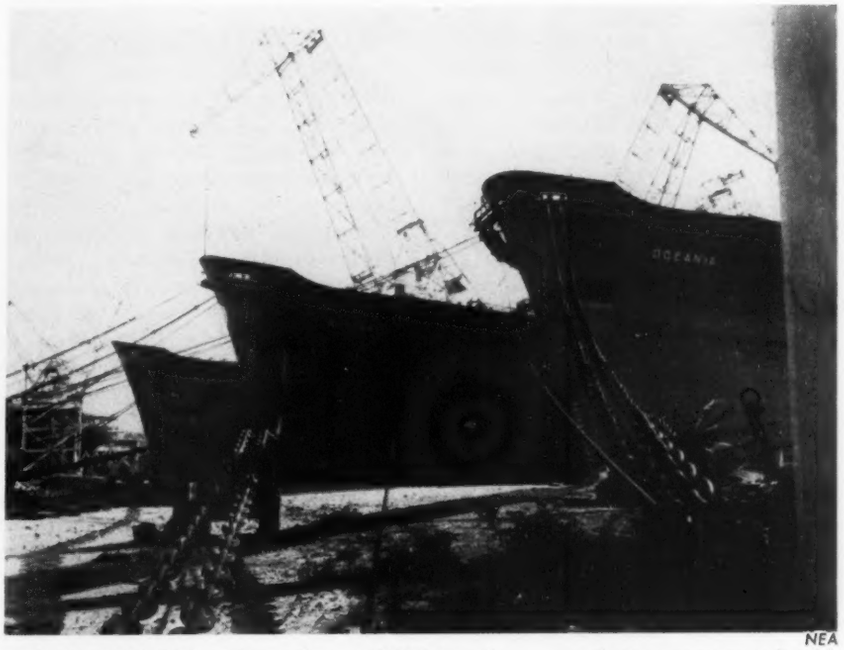
A race is on between the West German government's Ministry of Economics and the Steel Custodians appointed by the Allies to finish plans for the reorganization of heavy industries. The ministry has submitted a plan to the Allied High Commission which would create 23 German coal mining companies and 26 steel firms. Only ten of the latter have been laid out definitely, and negotiations are proceeding regarding the setup of the others. The Ministry of Economics says no nationalization will occur, unless the German parliament should reverse itself.

French Steel Output at Peak

French steel ingot production reached an alltime record of 937,000 net tons in October, compared with a monthly average in 1929 of 890,000 tons. Pig iron output in the month was 815,000 tons, compared with the monthly average in 1949 of 765,000 tons and 944,000 tons in 1929. Export prices are going up on steel, but slowly.

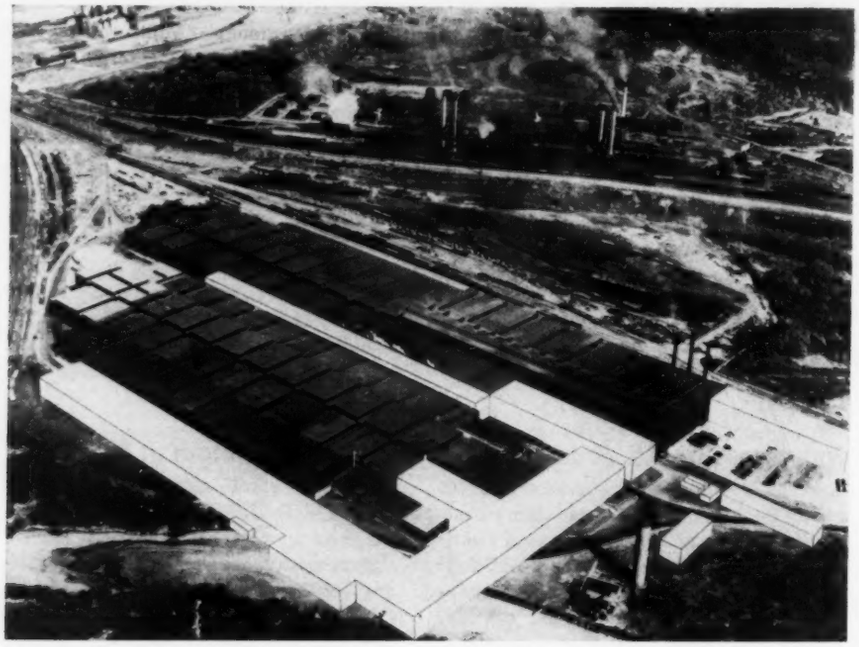
A boon to the French steel industry will be development of ore deposits at Konakry in French Guinea, West Africa. The ore has an iron content of about 51 per cent. Reserves are estimated at 2.2 billion tons.

Some 550,000 tons of ore will be exported in 1952 when materials handling and harbor facilities are modernized. Exports will be up to 1.2 million tons in 1952 and then to 3 million tons in the following years. Although most of the ore will go to Europe, the U. S. may get some.



NEA

DOLLAR EARNERS: These three 13,000-ton liners are being constructed with Marshall Plan Aid in Trieste shipyards. Their construction provided jobs for 6000 workers and an almost equal number of local artisans. When completed the vessels will give jobs to many unemployed Trieste sailors. The ships will also be valuable earners of foreign currency



EYE TO THE FUTURE: One of the many things that Republic Steel Corp.'s big expansion is going to mean is more hot and cold-rolled strip. Here is an aerial view of the 98-inch hot and cold strip mills and an artist's conception of the new structures to be added. The decision to expand in the Cleveland district was based on the confidence Republic has in the future of ore supplies from taconite materials in the Lake Superior region and the shipment of Labrador-Quebec ore into Cleveland

Nine Stacks To Augment Iron Capacity

Blast furnace capacity to be increased 3.6 million tons to 75.2 million total. Will help solve metallics problem in steel expansion programs now unfolding

NINE blast furnaces are under construction, on order or will be placed soon to provide 3.6 million tons of ironmaking capacity for the national steel expansion program. When they are completed, the industry will be able to produce 75.2 million tons of pig iron annually, or 19 million tons more than at the start of World War II.

This additional blast furnace capacity will help solve the problem of metallics for the larger integrated steel companies. The smaller non-integrated cold metal shops still have a problem in obtaining pig iron and find it necessary to move slowly in adding steelmaking furnaces. A half dozen of the larger companies are accounting for the bulk of the current expansion program.

The New Stacks—The nine blast furnaces include two for U. S. Steel's new tidewater plant at Morrisville, Pa., and one each for Crucible at Midland, Pa., Republic at Cleveland, Jones & Laughlin at Cleveland, Armco at Middletown, Youngstown Sheet & Tube at Indiana Harbor, Great Lakes at Ecorse and one still in the talking stage for an undisclosed location in the West.

And the Open Hearths—Jones & Laughlin got off to a head start on its big expansion program at Southside Works in Pittsburgh by letting contracts for six 250-ton open-hearth furnaces last spring which will be making steel in 1951. Under the government speed-up, five more are being added for a total of 2 million tons. Other big programs include six furnaces with capacity of 1 million tons each for U. S. Steel at Morrisville and Sheet & Tube at Indiana Harbor. Inland is adding four furnaces with capacity of 750,000 tons; Republic four with capacity of 672,000 tons at Cleveland.

Armco tapped steel from its new 592,000-ton open-hearth shop at Middletown in the record time of three days less than one year as part of its current program calling for a total of 1,017,000 tons. Armco started construction in 1949 when there was less pressure for materials and equipment. Construction now takes about 15 months.

Another Weirton Giant — Weirton is building another 500-ton open-hearth at its Weirton plant which will produce 225,000 tons annually. An eighth furnace, 200 tons, will go in at Kaiser's Fontana plant.

Remainder of the 9.4 million ton program scheduled for completion Dec. 31, 1952 will be effected mostly through furnace enlargements and increased use of hot metal. The industry now is feverishly working on plans which would further boost capacity above the present projected 110 million tons. Significantly, 1 million tons very well could go to the growing Southwest.

By 1975: 150 Million — Indicative of the industry's thinking is the statement by Charles R. Hook, Armco chairman, before the New York State Chamber of Commerce in New York: "I'll venture to say that on the drawing boards of steel plant engineering departments today are sketches which represent management's dreams of expansion projects far in excess of the approximately 10 million tons currently announced . . . capacity may well be as much as 150 million tons by 1975."

Costs and Shortages—Both shortages of materials and high costs are plaguing steelmakers in planning ahead. Steelmaking capacity costs about $300 a ton, against $120 in World War II and $75 prewar. One new plant for beneficiating 1 million tons of ore annually from taconite costs $25 million.

Blast furnaces cost $35 million a piece, posing an especially difficult problem for smaller shops faced with high scrap costs and the inability to finance such big undertakings even with government help.

Four tons out of the available supply go into construction of each 10 tons of new capacity. About 3 million tons of cast iron ingot molds are needed to pour 100 million tons of steel ingots but, of course, these molds later can be charged as scrap.

Republic's Expansion

WHEN REPUBLIC Steel Corp.'s $75-million steelmaking expansion program is complete—early in 1952—it will push the Cleveland district's steelmaking capacity over 5½ million tons per year, providing about 5½ per cent of the nation's steel. The program will add 672,000 net tons of steel ingot capacity per year to Republic's Cleveland plant. That is in addition to 180,000 tons resulting from an expansion of an open-hearth plant nearing completion. Present steelmaking furnaces have an annual capacity of 1,937,000 tons. Annual capacity after completion of the

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$75 million program will be 2,609,000 net tons. Annual capacity of U. S. Steel's National Tube Co. at Lorain, O., is 2,250,000 net tons; Jones & Laughlin Steel Corp. can produce 945,000 net tons at Cleveland.

Losing No Time—Republic already awarded Koppers Co. Inc., Pittsburgh, a contract—well in excess of $30 million—to build a complete coke oven plant to house 126 coke ovens. Koppers' Engineering & Construction Division will build the coke plant which will consist of two 63-oven batteries.

Koppers' wholly owned subsidiary Freyn Engineering Co., Chicago, will build the steelmaking facilities, four 275-ton open-hearth furnaces. They should be in operation by January, 1952.

Republic's other major facilities include: A 1400-ton blast furnace and the necessary steam-generating and blowing equipment; new soaking pits, replacing and supplementing capacity of the present eight blocks to provide for the necessary reheating of ingots; improvements to the present 32-inch blooming mill to facilitate rolling of slabs; a new 72-inch tandem cold reducing mill for production of additional cold-rolled sheets; major changes and additions for heating, annealing, pickling and other processing for production of sheets and strip.

Where It Started From — C. M. White, Republic's president, says part of the program includes acquisition of the No. 5 blast furnace and the Reconstruction Finance Corp. coke plant that Republic has been operating through sub-lease from Kaiser-Frazer Corp. Those facilities were built and operated by Republic for the government during the war. Kaiser-Frazer exercised an option in its lease to purchase the facilities from the government and resold the coke plant and blast furnace to Republic.

Right now Republic is operating in its Cleveland district plant five blast furnaces, 15 open-hearth furnaces and five batteries of coke ovens totaling 279 ovens.

What It All Means—The expansion will provide jobs for 800 more men; the added payroll will come to about $3.3 million. To supply Republic's present Cleveland facilities it takes the equivalent of 225 shiploads in an average size lake ore carrier—2¼ million tons of iron ore—per year; additional ore requirements will be about 1 million tons. Coal requirements in the past have been 2 million tons per year at peak operation; new facilities will require an additional million tons, an amount equivalent to 154 trainloads, each a mile long.

Growing Southwest

Armco's Sheffield Steel Corp. In Houston now has a 72,000-ton monthly capacity

ONLY A FEW miles from downtown Houston on a deep-water channel leading to the Gulf, Armco Steel Corp.'s wholly-owned Sheffield Steel Corp. is rapidly expanding along with the virile and growing Southwest. Now, Sheffield can sell nearby all the steel it can make but it has a weather-eye open for future markets abroad.

The original plant, designed to operate all-scrap, went into operation shortly after Pearl Harbor. The government financed coke ovens and a blast furnace, making the plant completely integrated, and Sheffield took over in 1948.

On Jan. 1, 1950, an eighth open hearth went into production, increasing capacity from 63,000 to 72,000 tons per month; a 75-ton electric furnace is under way that will add another 12,500 tons per month. That furnace will be used for making carbon steels but could readily be switched to alloy.

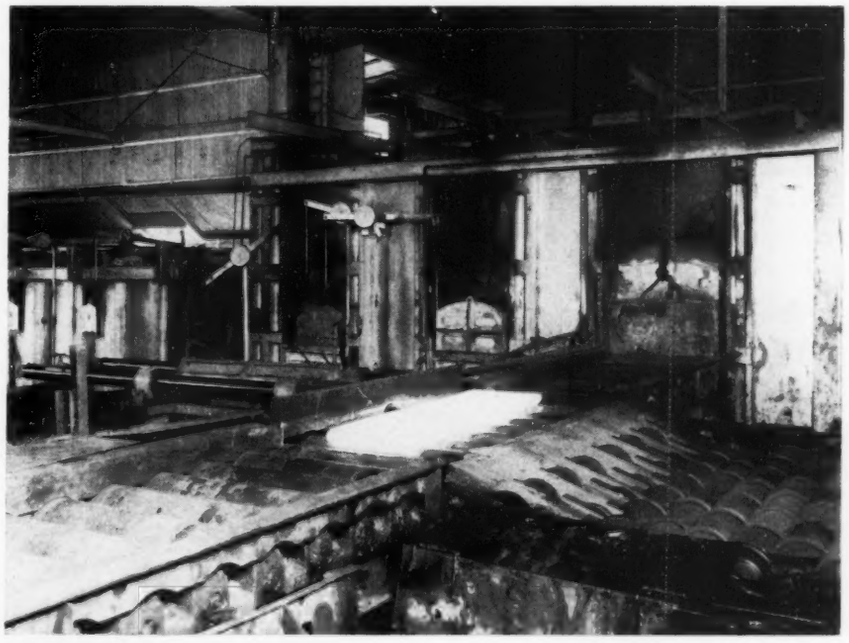
Right Next Door—A new 116-inch plate mill went into operation Aug. 15 and a 130-inch plate mill now is being erected, primarily to make pipe skelp for the new A. O. Smith Corp. of Texas plant next door, in which Sheffield has a half interest.

The present 6-stand 14-inch merchant bar mill is being expanded by adding seven more mill stands that will be ready about Jan. 1. The mill will provide relief for the 17-stand continuous rod mill which then can be confined to production of rods for the wire mill.

After completion of the new facilities, Sheffield will be able to make these tonnages of finished steel per month: Plates for pipe, 40,000 tons; customer plates, 5000 tons; structurals, 5000 tons; plain, galvanized and barbed wire, nails and fencing, 6000 tons; bars, mesh and merchant mill products, 14,000 tons.

Rubber-Neck Wagon—F. Ray McFarland, division manager, who has supervised construction from the start, also has the chore of showing local Texans something about big-time steel operations. For school teachers this month, he converted a railroad flat car into a "rubber-neck" wagon decked out in fancy colors and ran it around the plant.

Line pipe production at A. O. Smith Corp. of Texas plant is up to 70 cars a day and E. L. Evenson, plant manager, is setting up a goal of 100 cars daily—2200 tons of steel. Biggest order is for 388,938 tons of 30-inch transmission line for carrying natural gas 996 miles from Texas to Chicago. Shipments, scheduled for completion July 31, are being made to Illinois, Arkansas and Texas. The line is flash welded from 0.344-inch plate in 40-foot lengths.



GAS FOR STEEL: This slab reheating furnace is an example of the way Sheffield Steel of Houston makes use of the enormous supplies of gas close at hand. A slab has just emerged from the furnace and is on its way for conversion into plate. In open-hearth furnaces Sheffield uses gas and fuel oil on a 50-50 basis. Texas, incidentally, has 55 per cent of the nation's gas reserves

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Detroit has plenty of tricks up its collective sleeve when it comes to getting materials to keep the production lines flowing, so don't sell it short

DETROIT

DON'T sell the auto industry short when it comes to keeping production humping despite high hurdles along the materials procurement path. Its buyers, follow-up men and other specialists in keeping the stuff moving to the assembly line are about as expert as they come. And backing them up is a list of connections throughout the world that seem continually to be coming up with ideas on some cagey way to buy where there is apparently nothing for sale.

At the onset of the last war, when materials began to get tough, this procurement and engineering expertness was widely demonstrated. Innumerable switches were being made regularly—one steel to another, plating to paint, aluminum to steel, cadmium to zinc and so on down the line.

Finally, when automobile production was forcibly exterminated in 1942, the job was finished, at least until 1945 when it started all over again because of difficulties in getting the flow of desired materials and parts turned on again.

Like Hotcakes—Many new car buyers, it will be recalled, drove their 1946 models with wood bumpers for awhile (this writer was one). Speedometers were missing and many substitute parts were still in production. The heat was not long on suppliers until the deficiencies were corrected, but in the interim cars were being built and were being sold like hotcakes.

Some observers who have been exposed to today's atmosphere in Washington are coming back with dire predictions of how tough it is going to be after the first of next year, or possibly after the first half of next year, to keep on turning out passenger cars and trucks in the face of sharp cuts in steel, copper, aluminum, zinc, lead, tin or what have you. They don't scare Detroit where there are plenty of tricks up sleeves when the pressure is on. If the market for cars continues hot, or at least medium warm, the car builders will find some way to satisfy the demand, even if quality does have to suffer a little.

Spell It Out—All they want Washington to do is to spell out the defense requirements: How many tanks? How many guns? How many trucks? How much ammunition? Who should make them? How soon? Then, keeping within the limits of open-market materials available, the cars and trucks will be built concurrently.

Maybe Chiang-Kai-Shek has a few more bags of nickel coins he would like to sell for melting down into plating anodes. Maybe there is some nickel kicking around in Norway. Maybe the Belgians, or the French, or the West Germans, have some steel they would like to peddle. Maybe there are some untapped sources for materials in Mexico, Central America, South America. If the answers are yes, the auto plant buyers will not be wasting time doing something about it.

Auto Truck Output

U. S. and Canada

	1950	1949
January	609,882	445,092
February	505,593	443,734
March	610,678	543,711
April	585,705	569,728
May	721,161	508,101
June	897,864	523,689
Six Months	3,941,883	3,034,055
July	746,771	604,351
August	842,304	678,092
September	760,808	657,073
October	804,553*	601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
Nov. 4	177,096	116,699
Nov. 11	161,113	114,856
Nov. 18	122,498	115,152
Nov. 25	120,000	76,026

Estimates by Ward's Automotive Reports

* Preliminary.

Allout Production Push Over?

This is not to infer any continued outpouring of motor vehicles at the clip of the past June-October period which was something the industry itself never believed possible of attainment. Even the confirmed optimists of a few years back never talked anything better than a 7.5 million car year, and here we've been going at an 8 million rate for six months or more. The allout push for production now seems to have run its course, and December and January are likely to level off at around 500,000 cars and trucks, U. S. and Canada. Even that may take some scrounging for tight materials, but if the expected demand for 1951 models materializes the manufacturers will keep them rolling to dealers.

Part of the current sag in production is explained by model changeovers at some GM divisions, all of short duration. Pontiac, for example, expected to be shipping new models from its Pontiac plant early last week, and branch assembly plants were to start Wednesday. Field stocks of the previous model were well distributed and not large, so dealers generally have no carryover problem. Public introduction of the '51 job will be deferred until Dec. 11 and by that time all old inventories should be cleared from sales floors. Prices will be disclosed at that time, and H. J. Klinger, Pontiac general manager for his own part thinks "there should be some increase."

Chevrolet unveiled its new stuff for the press last Monday but will make no public announcement for several weeks. Runout of 1950 passenger car models was at a furious pace of practically 6500 a day and the switch to the new design was made with a minimum of delay, for one reason because of the relatively few changes involved. Output so far this year, until the changeover, came close to 1.4 million, not counting an additional 450,000 trucks, and knocking all old records for a loop.

Needed: A Penchant for Names

Christening of a new automatic transmission, like naming the new baby, is usually a hectic family affair. Everybody has a suggestion: The advertising department will come up with something fancy like Flexitork. The engineering department says that's silly; just call it a plain automatic transmission. The sales department says no, you've got to have a fancy handle to sell these things. The president says he always took a fancy to Nancymatic because that is his daughter's name. So all the names are put on slips of paper and

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dumped on a table. Then a committee, representing all departments of the company, sifts through them to make a selection. When the final choice is made, everybody groans and says it's a stinker, each one objecting because his brainwave was not accepted.

Whether exactly this procedure was followed in naming the new Ford transmission we do not profess to know. The approved name—Fordomatic Drive—does not suggest its originator stayed awake nights thinking it up. Similarly, Mercury's choice of Mercomatic as its identification of the same transmission rates no encomiums for originality. The answer probably is that the esoteric was ruled out in favor of the earthy, the corn in favor of the bread and butter.

Whatever the name, the proof is in the performance, and if years of the most grueling kinds of tests mean anything then the new Ford and Mercury transmission will become the next thing to standard. Peculiarly enough a Mercury buyer, not in Detroit, reports that the salesman with whom he did business made a determined effort to "unsell" him on buying the transmission (probably because he had no cars in stock so equipped).

Soft Seats and Hardtops

Dual-spinner grilles (just a single spinner in 1950) and a wider, longer wraparound bumper are calculated to give a more massive appearance to the front ends of 1951 Ford models which hit the showrooms last week. Parking lights are restyled and larger chrome headlamp rims extend beyond the lenses. Added chrome and new, larger tail lamps snap up rear-end appearance of deluxe models. Some chrome decoration has been removed from the standard models in the attempt to balance the additional brightwork on the higher-priced series. On horizontal radiator grille bars, chrome plate is stopped off about half way and the rear portion finished in "argent," a paint with aluminum powder pigment.

Designers' touches are reflected in new instrument panels with what is called a "Chanalited" instrument cluster. The speedometer pointer has a glowing ring which encircles and illuminates the figure showing the speed. Control knobs on the panel are mounted in depressed cups, each individually lighted. Key starting is provided by a new ignition switch which incorporates starter control. A key release lock has been installed on the counterbalanced rear deck lids.

The Cushion Effect—Softer ride is claimed to result from suspension improvements and automatic ride controls. A new control valve is used in the hydraulic shock absorbers to adjust the cushioning effect through a wide temperature range; the combination of new tension-type rear springs and a softer front spring rate maintains proper balance between the front and rear suspension for a level road on all types of road surfaces.

Ford has developed a "hardtop" model, tentatively called the Victoria for the want of a better name to identify this type of body, which has spread through most of the industry. Basically the same as the General Motors and Chrysler versions, it has a number of distinctive decorative touches to differentiate it. Production on this model will not be under way before January, so there will be no announcement or promotion until assemblies can be started.

Continuing in the Ford line are the convertible and Crestliner, along with coupes, two-doors and four-doors. All except the first two may be had with either V-8 or 6-cylinder engine.

It's a pretty good bet that Ford will push its six engine a little harder than in the past, for one reason because of the competitive angle with Chevrolet and another because of the upcoming brand new six to be built in the vast Cleveland motor plant and foundry, steelwork for which is now pretty well in place. Delays have plagued the erection of this important new facility, but it is hoped to have operations functioning in time for the 1952 models.

The Color Question

Speaking of names again, little restraint is shown in dreaming up appellations for the various colors offered on passenger cars. They have come a long way from the day when Henry Ford made his now-trite remark: Give 'em any color they want as long as it is black. Thus, new on the Ford line for 1951 are Coral Flame red, Alpine blue, Culver blue, Sea Island green, Greenbrier metallic and Mexacalli maroon (Mexicali Rose would certainly detest that last one).

Introduction of the Fordomatic torque-converter transmission, along with two engines, gives prospective buyers six power combinations to choose from, inasmuch as conventional synchromesh, either with or without overdrive, continues to be available.

Nash and Packard May Resume

Settlement of the American Metal Products Co. "eatdown" strike should permit Nash and Packard to resume assemblies this week, although Nash had removed its tools from the supplier's plant under a writ of replevin and has not revealed whether it will return them or have the parts made elsewhere.

Three automakers, Ford, Studebaker, Kaiser-Frazer, also purchased parts from American Metal Products. They were not affected as seriously by the tieup as were Packard and Nash. K-F of course having cut off its second shift to change equipment for increased production of the Henry J

FORD FOR '51
Fordomatic Drive . . . . no Mexicali Rose but Mexacalli Maroon

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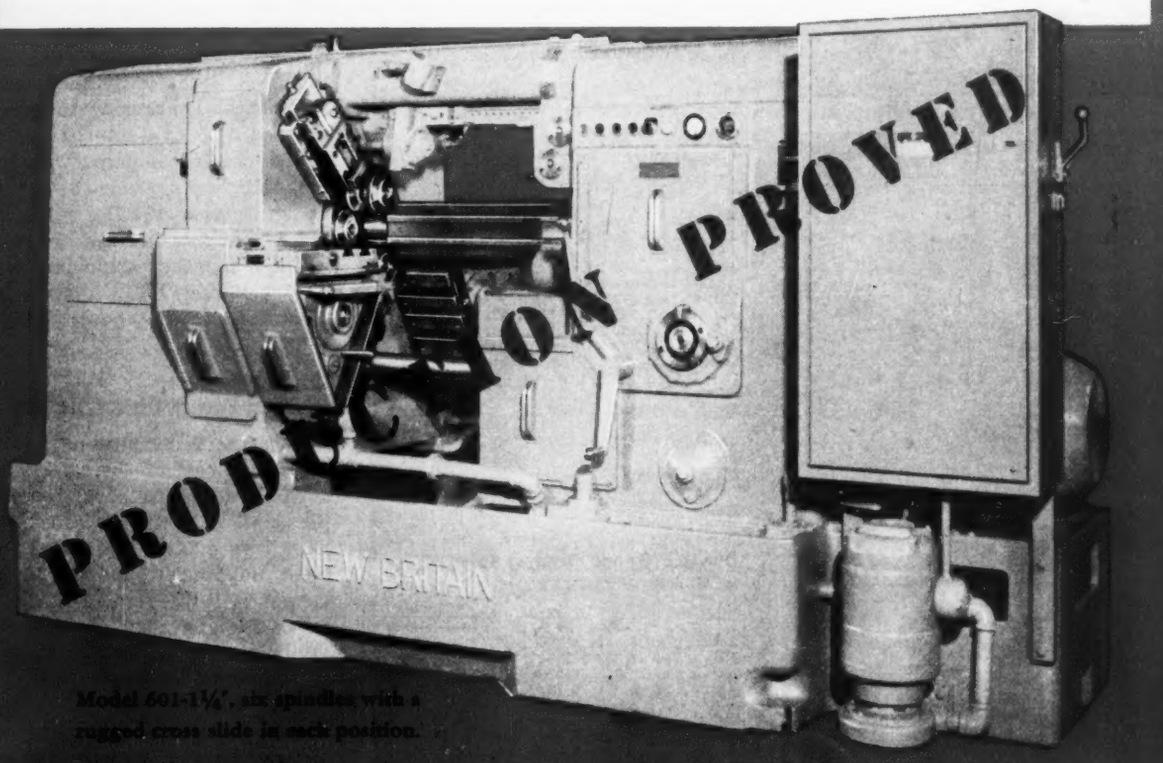
There's no testimonial like a re-order...

MANUFACTURERS ARE RE-ORDERING NEW BRITAIN AUTOMATICS BECAUSE THEY ARE SATISFIED WITH THE MAIN FEATURES WHICH MAKE AN AUTOMATIC PAY OFF:

- Ease and safety of operation
- Minimum down-time for repair
- Minimum down-time for set-up and change-over
- Flexibility of tooling
- Elimination of second operations



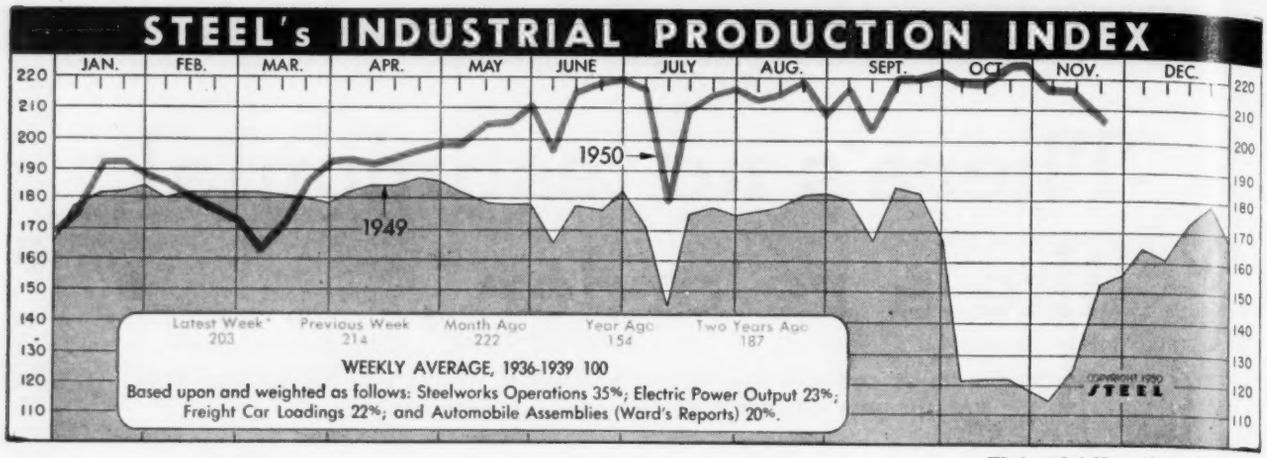
Model 601-1¼", six spindles with a rugged cross slide in each position.

NEW BRITAIN

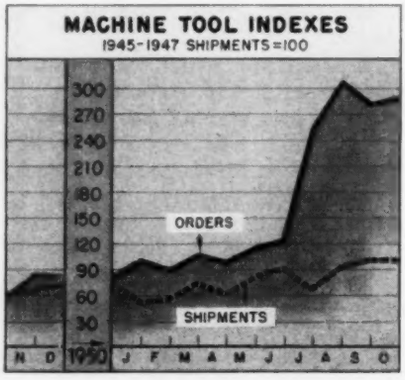
Automatics

THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN-GRIDLEY MACHINE DIVISION
NEW BRITAIN, CONNECTICUT

AUTOMATIC BAR AND CHUCKING MACHINES • PRECISION BORING MACHINES • BUCAS HORIZONTAL BORING, DRILLING AND MILLING MACHINES



Week ended Nov. 18 (preliminary).

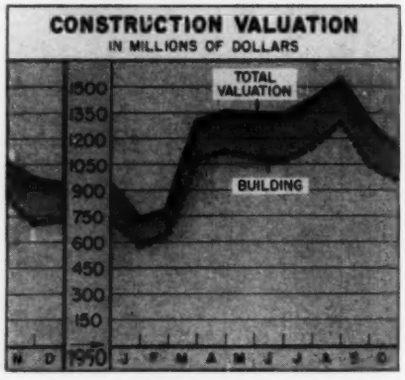


Charts—Copyright 1950, STEEL

Machine Tool Indexes

	New Orders 1950	New Orders 1949	Shipments 1950	Shipments 1949
Jan.	99.7	87.0	52.4	68.8
Feb.	89.2	80.9	56.1	70.3
Mar.	107.4	93.5	75.3	75.8
Apr.	98.9	70.1	61.6	74.7
May	116.4	63.7	82.5	72.8
June	126.2	53.6	91.9	79.0
July	253.1	48.0	68.3	60.7
Aug.	305.1	51.5	95.7	67.3
Sept.	280.6	57.7	101.6	67.6
Oct.	290.5	56.8	101.1	62.3
Nov.	....	84.3	...	67.6
Dec.	....	82.5	...	75.7

National Machine Tool Builders' Assoc.

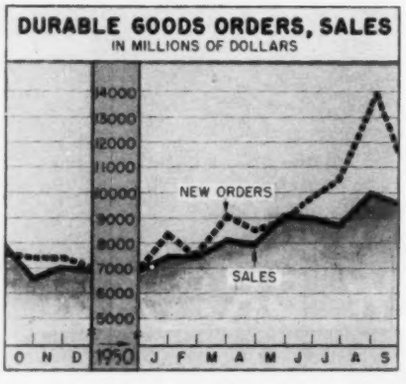


Construction Valuation

(37 States)—In Millions of Dollars

	Total 1950	Total 1949	Building 1950	Building 1949
Jan.	730.9	483.0	578.8	381.0
Feb.	779.5	568.5	627.0	415.0
Mar.	1,300.2	747.6	1,075.3	579.2
Apr.	1,350.5	842.6	1,123.5	620.2
May	1,347.6	880.3	1,083.0	666.9
June	1,345.5	945.7	1,072.0	706.7
July	1,420.2	943.6	1,162.2	690.9
Aug.	1,548.9	905.7	1,295.1	671.5
Sept.	1,286.5	1,093.7	1,048.3	870.6
Oct.	1,135.8	1,061.8	956.7	857.8
Nov.	....	957.8	....	701.3
Dec.	....	929.0	....	722.2
Total	....10,359.3		....	7,883.3

F. W. Dodge Corp.



Durable Goods Orders, Sales

In Millions of Dollars

	New Orders 1950	New Orders 1949	Sales* 1950	Sales* 1949
Jan.	8,377	6,706	7,471	7,550
Feb.	7,513	6,734	7,461	7,757
Mar.	9,075	7,185	8,127	7,805
Apr.	8,531	6,127	7,956	7,445
May	8,909	5,993	9,089	7,488
June	9,814	6,544	9,030	7,745
July	10,553	6,195	8,670	7,207
Aug.	13,900	7,407	10,100	7,387
Sept.	11,600	7,634	9,500	7,335
Oct.	....	7,432	....	6,542
Nov.	....	7,402	....	7,041
Dec.	....	7,019	....	6,960

* Seasonally adjusted. U. S. Office of Business Economics

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Employ., Steel Nov.20	Indus. Produc. Nov.6	Ranges, Gas Nov.13
Fab. Struc. Steel...Nov.6	Ironers Nov.13	Refrigerators Oct.23
Fdry. Equip. Orders.Nov.6	Malleable Iron Oct.30	Steel Castings Nov.20
Freight Cars Nov.20	Price Indexes Nov.6	Steel Forgings Nov.20
Furnaces, Indus. ..Nov.20	Pump Orders Nov.13	Trucks, Elec. Ind. ..Jan.2
Furnaces, W. Air ..Nov.20	Purchasing Power ..Oct.2	Vacuum Cleaners ..Nov.6
Gear Sales Nov.13	Radio, TV Aug.14	Washers Nov.13
Gray Iron Oct.30	Ranges, Elec. Oct.30	Water Heaters Nov.13

Tool Orders Move Up

New orders for machine tools continued to be placed at a rapid pace in October. The National Machine Tool Builders' Association's new orders index moved up to 290.5 from 280.6 in August. Foreign orders, included in the new orders total, moved up to 48.8 from 27.2 in the preceding month.

Shipments eased half a point in October to 101.1 from 101.6 in September. Ratio of unfilled orders to shipments continued to rise and reached 11.6 to 1 at the end of the latest month, compared with 9.8 to 1 a month earlier and 3.8 to 1 at the end of October, 1949.

Association's indexes are based on average monthly shipments in 1945-1947 equaling 100. Average annual shipments in the base period were $355 million.

Downtrend in Construction

Construction contract awards in the states east of the Rockies moved downward in October following a seasonal pattern. Awards for the month were $1136 million, 12 per cent below September but 7 per cent above October, 1949, says F. W. Dodge Corp. The ten month total is $12,246 million and is 45 per cent higher than for the same months in 1949.

Contracts awarded in the first ten months this year total 1,115,216,000 square feet of floor area and top the corresponding 1949 figure by 57 per cent.

October's residential awards were off only 4 per cent from the September total to $529.9 million. Nonresidential awards showed a larger drop of 15 per cent to $426.8 million. Both categories exceeded totals for October, 1949. Public and private works and utilities totaled $179.1 million, 25 per cent below the September figure and 12 per cent less than the October, 1949, total.

UNIVERSITY OF MICHIGAN LIBRARIES

The Business Trend

Metals shortages are already putting a crimp in civilian goods production but after the first of the year there will be further cutbacks

CIVILIAN goods production is getting more difficult and after the first of the year cutbacks will become more pronounced. By that time the diversion of metals to military and essential civilian programs will be big enough so that the willingness to pay premiums for materials in order to keep production lines rolling will not be able to fill the gap.

There is already some falling off in civilian goods output. In some instances it is merely a reflection of easing in demand, in others tighter credit terms are having an effect but tight supplies are reducing outturn in appliances and automotive industries despite demand being maintained.

In the week ended Nov. 18 STEEL's industrial production index reflected this enforced slowdown and dropped 11 points to a preliminary 203 per cent of the 1936-1939 average. Although output is more than double the base period it is the lowest point for the index since the week ended Sept. 9 when production was down because of a holiday. A year ago the nation was recovering from the steel strike.

Big Drop in Autos . . .

Passenger car and truck output declined sharply to 122,498 units in the week ended Nov. 18 from 161,009 in the preceding week and accounted for almost all the drop in the index. Only Chrysler among the industry's Big Three kept its output at a normal pace. General Motors had two divisions down for model changeovers and Ford produced at half speed. Among the independents Nash and Packard were down because of a supplier's strike and the others battled components shortages. Last week many builders scheduled Friday work but absenteeism following a holiday never permits full output to be realized. Although 1950 will be a record year for the automotive industry, November and December totals will not reach earlier estimates. Only General Motors among the industry's giants appears able to meet November and December plans and this may be at the cost of operations early next year.

Lofty Steel Rate . . .

Steelmaking furnace operations above rated capacity are becoming commonplace. Last week steel mills operated at about the same pace as in the week ended Nov. 18 when the rate was 102.5 per cent. Not only are operations maintained at a high rate but new capacity additions are announced almost weekly. Expansion is not being confined to one segment of the industry but is going across the board from development of ore deposits to addition of finishing facilities. The steel industry is plowing back its profits into sizable improvements.

Coal Output Steady . . .

Maintenance of bituminous coal mining operations at a weekly average slightly in excess of 11 million net tons has pushed the aggregate for the year through Nov. 11 to 432.6 million tons, compared with 363.7 million tons in the corresponding

BAROMETERS of BUSINESS

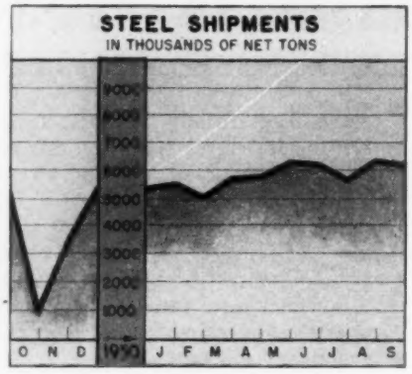
		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	102.5	103.0	102.0	56.0
	Electric Power Distributed (million kilowatt hours)	6,570‡	6,574	6,503	5,644
	Bituminous Coal Production (daily av.—1000 tons)	1,833	1,896	1,917	1,197
	Petroleum Production (daily av.—1000 bbl)	5,920‡	5,910	5,902	5,211
	Construction Volume (ENR—Unit $1,000,000)	$214.9	$101.9	$260.7	$217.8
	Automobile and Truck Output (Ward's—number units)	122,498	161,009	188,323	115,152
TRADE	Freight Car Loadings (unit—1000 cars)	845†	840	891	759
	Business Failures (Dun & Bradstreet, number)	150	135	165	183
	Money in Circulation (in millions of dollars)‡	$27,395	$27,388	$27,228	$27,397
	Department Store Sales (changes from like wk. a yr. ago)‡	+8%	none	+11%	−8%
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$16,319	$13,318	$15,431	$12,928
	Federal Gross Debt (billions)	$256.7	$256.7	$256.7	$256.9
	Bond Volume, NYSE (millions)	$18.5	$16.0	$17.7	$20.6
	Stocks Sales, NYSE (thousands of shares)	8,500	7,827	10,883	7,420
	Loans and Investments (billions)†	$69.3	$69.2	$68.7	$66.7
	United States Gov't. Obligations Held (millions)†	$33,555	$33,555	$33,358	$37,042
PRICES	STEEL's Weighted Finished Steel Price Index††	157.76	157.76	157.62	152.52
	STEEL's Nonferrous Metal Price Index‡	239.5	244.9	226.5	169.3
	All Commodities†	171.1	170.0	168.7	151.6
	Metals and Metal Products†	180.1	180.6	179.7	177.8

*Dates on request. †1950 weekly capacity is 1,926,803 net tons. 1949 weekly capacity was 1,843,516 net tons. ‡Preliminary.

†Preliminary. ‡Federal Reserve Board.

†Member banks, Federal Reserve System.

†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.

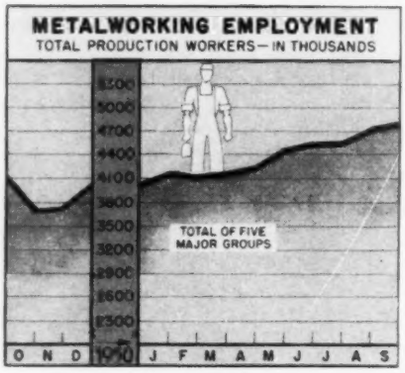


Steel Shipments

Net Tons

	1950	1949	1948
Jan.	5,482,691	5,788,632	5,410,438
Feb.	5,134,780	5,519,938	5,046,115
Mar.	5,723,340	6,305,681	5,978,551
Apr.	5,780,453	5,596,786	5,096,161
May	6,252,672	5,234,862	5,321,375
June	6,192,438	5,177,259	5,476,774
July	5,668,898	4,534,855	5,229,880
Aug.	6,326,464	4,918,314	5,329,060
Sept.	6,145,354	5,236,196	5,511,474
Oct.	.....	935,037	5,902,008
Nov.	.....	3,296,809	5,732,256
Dec.	.....	5,410,902	6,056,282

American Iron & Steel Institute

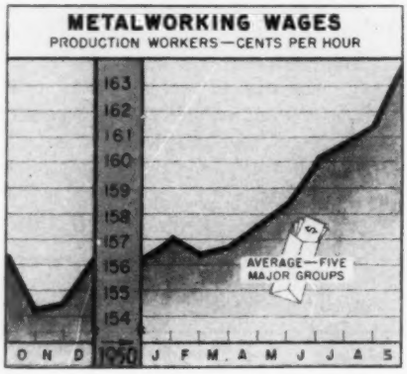


Metalworking Employment

Production Workers—Five Major Groups

1949	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Sept.	938	708	935	531	1,017
Oct.	559	677	922	548	986
Nov.	737	666	908	546	898
Dec.	955	988	929	558	896
1950					
Jan.	963	693	936	561	978
Feb.	977	699	959	572	872
Mar.	982	709	981	580	879
Apr.	1,007	722	1,003	595	899
May	1,025	742	1,022	605	1,046
June	1,051	769	1,034	615	1,078
July	1,053	772	1,031	623	1,075
Aug.	1,084	813	1,057	658	1,122
Sept.	1,103	831	1,057	653	1,140

Bureau of Labor Statistics



Metalworking Hourly Wages

Production Workers—Five Major Groups

1949	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Sept.	160.7	147.4	153.8	144.7	167.4
Oct.	155.6	145.9	153.6	143.5	165.6
Nov.	158.0	145.1	153.8	143.5	166.2
Dec.	159.7	147.2	154.3	144.6	168.4
1950					
Jan.	161.5	148.8	154.7	144.3	168.2
Feb.	160.2	148.1	155.2	144.5	167.7
Mar.	160.4	148.0	156.0	144.3	167.8
Apr.	160.9	148.8	156.9	144.6	170.6
May	161.9	149.5	157.6	145.3	169.8
June	163.0	151.4	158.3	145.0	172.3
July	164.6	152.2	159.3	146.9	172.9
Aug.	164.0	153.4	160.3	147.1	173.8
Sept.	167.4	155.9	162.7	149.6	175.3

Bureau of Labor Statistics

Charts—Copyright, 1950, STEEL

period last year. In 1949 repeated stoppages and three day work-weeks kept the total low. This year operations have held steady since the strike was settled in the spring and stockpiles have been built up from the low point reached late last winter.

Electric Power Peak . . .

Electric energy distributed by the electric light and power industry in the week ended Nov. 11 amounted to 6574 million kwhr and set a new record. The previous record was set in the week ended Oct. 28 when the total was 6563 million kwhr. New records are virtually certain in coming weeks when domestic requirements which normally increase sharply in winter months are added to the large industrial consumption. Edison Electric Institute reports that electric energy generation in the week ended Nov. 11 was 21 per cent higher than in the corresponding week in 1949.

Prices Rise Sharply . . .

Bureau of Labor Statistics reports its wholesale price index rose 0.6 per cent in the week ended Nov. 14 to 171.1 per cent of the 1926 average. The latest index is 0.5 per cent above the previous high set in August, 1948. A sharp rise in meats led a general advance in primary market prices. Commodities other than food and farm products rose slightly from 162.2 to 162.7. STEEL's nonferrous price index for the week ended Nov. 18 eased to 239.5 per cent of the 1936-1939 average from alltime high of 244.9 recorded in the preceding week.

FRB Seeks Voluntary Curbs

Chairman McCabe asks banks to limit loans to rock bottom needs of borrowers

AN APPEAL for member banks to screen loans carefully as a substitute for an immediate increase in reserve requirements was made last week by Federal Reserve Board Chairman McCabe. Though his letter to banks made no mention of the expected increase in reserve requirements it is interpreted as indicating a temporary postponement of such action.

Mr. McCabe notes a $5 billion increase in bank credit from midyear to Nov. 15 and says a growth of bank credit not balanced by increased production will put added pressure on prices, impairing the buying power of the dollar and adding to the cost of the defense program. He urges banks to analyze all loan applications and to advise applicants to hold their borrowing requirements to the lowest limits consistent with the rock bottom needs. Even individually sound credits are inflationary if in the aggregate they add unduly to a growing supply of money which in turn competes for limited supplies of labor and materials, the board chairman says.

Housing Starts Slide

Homebuilding starts in October were down 12,000 units or 10 per cent from the September total, the Bureau of Labor Statistics estimates. The latest month's total was 103,000 units and was below the 104,300 unit volume recorded in October, 1949, when housing activity was at a peak for that year.

October was the first month this year that new housing volume was under the level of the corresponding month last year. The bureau states it is not possible now to determine the effect on housing starts of Regulation X and related curbs.

Dwelling unit starts in the first ten months totaled 1,209,100 and topped the corresponding 1949 total by 42 per cent. Public housing was a smaller factor this year than last as it accounted for 23,000 units, 30 per cent below the 1949 total.

Big Year for Cleveland Graphite

Earnings this year will set a new record and sales will reach peacetime peaks for Cleveland Graphite Bronze Co., James L. Myers, president, and John W. Dixon, vice president and treasurer, told the Cleveland Society of Security Analysts.

Earnings for the year will total about $4 million or about 10 per cent on sales. Previous peak earnings were $3,063,394 in 1948; last year the company earned $2,635,248. Sales are expected to reach $40 million, topping the previous peacetime high by about $9.5 million. Last year sales were almost $29.6 million.

Like other industrial concerns, Cleveland Graphite is currently hampered by material shortages. Steel supplies are the primary concern and a similar but less acute situation exists in copper. Nickel supplies are also tight.

How much these shortages will hurt the company next year cannot be accurately determined at this time but officials expect volume will be reduced possibly by 20 per cent. An increase in defense business will probably offset some of the loss in civilian lines but physical volume is expected to be down. There probably will be some time lag between the reduction in civilian business and a rise in defense volume.

Backlog Nearly Doubles

Unfilled orders at the end of the third quarter increased to $9,480,000, compared with $4.8 million a year ago, reports Food Machinery & Chemical Corp., San Jose, Calif. A high order rate in the third quarter pushed the total to its high level. The company is just completing manufacture of new citrus juice extractors for the juice canners and the juice concentrate manufacturers of Florida, Texas and California. Returns from these products are expected to add materially to the company's leased machinery income in 1951.

Commenting on future prospects, President Paul L. Davies explains that a high level of business is expected in 1951 for all the company's divisions provided certain critical materials such as aluminum, copper, steel and benzol are not too greatly restricted.

Sales Estimate Goes Up

President William Balderston, Philco Corp., Philadelphia, says his company's sales estimate this year has been revised upward to $335 million from the $300 million reported earlier.

The yearend should see the company in the strongest financial position in its history with working capital in excess of $40 million.

Looking ahead he expects a good first quarter next year and says that Philco's increasing participation in government business will be a big factor in figures for 1951's second half. Mr. Balderston expects government work to be rolling at a high figure in the last half of next year.

Gas Appliances Ride High

Public demand for gas appliances in areas opened up to natural gas boosted Servel Inc.'s sales in the fiscal year ended Oct. 31 about 50 per cent above a year ago, says President W. Paul Jones. The Evansville, Ind., company makes gas equipment and gas appliances.

Mr. Jones predicts a continued demand in 1951. The reasons: The New York market is getting natural gas late this year; permission was granted for a line to New England that may be ready by next fall; discussions are being held on piping natural gas to the Pacific Northwest soon.

He says continued growth could mean an increase in demand next year that would send sales up another 50 per cent—if material cutbacks ordered by defense authorities do not interfere too seriously with production plans.

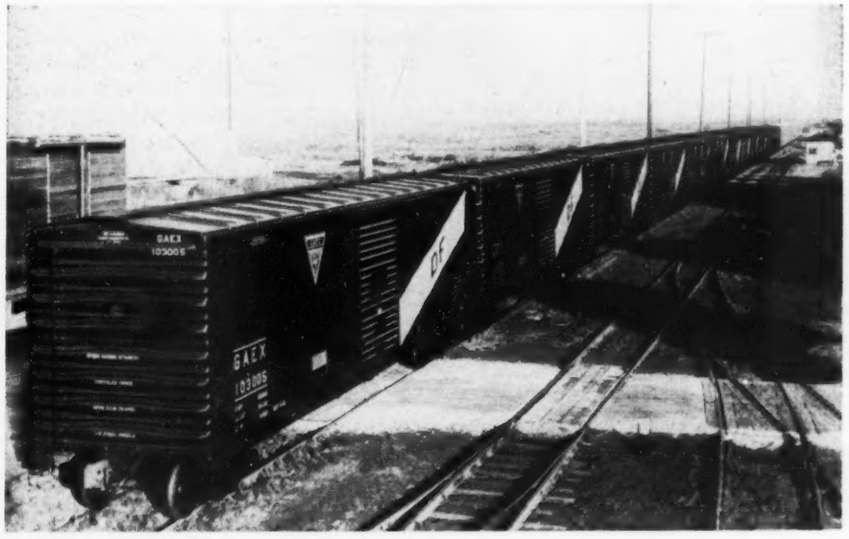
Freight Car Deliveries Fall Short of Estimate

FREIGHT car deliveries in the next four months will be about 20 per cent below the estimate made on Oct. 1. Deliveries for November-February are now estimated at 27,500. A large expansion in production and insufficient steel are hampering current output. Even after the private carbuilders and railroad-owned shops begin getting steel allocated under the NPA program on Jan. 1, components shortages are expected to hinder output.

This month deliveries will total about 6000 cars and fall about 1000 short of their goal. December deliveries will be between 6500 and 7000 instead of 7500. Carbuilders hoped to be able to get their deliveries up to the 9600 car per month level with pre-allocation steel by January or February and up to 10,000 by March. Now this figure is revised downward to 7500 in the first two months next year.

Once the carbuilders and the railroad shops hit their stride there may be enough work to maintain high level operations for several years. The present backlog will keep them busy for a year and William T. Faricy, president of the Association of American Railroads, says it will be necessary for the carriers to order 267,000 cars between now and July 1, 1953. This number is required to offset retirements and build up the freight car fleet to 1,850,000 by the latter date.

Heavy repairs and rebuilding at a 35,000 car a month pace has reduced the accumulation of bad order cars to 5.7 per cent of car ownership from the accumulation that had grown up in the period of car surpluses. The daily car shortage dropped to 35,000 in October, which was probably the peak month in loadings from 40,000 in August, Mr. Faricy says, and is currently running at 27,000. Better car design, improved loading and shipping practices and quicker turn around time are other factors in the improvement.



LEASED CARS HELP WHITTLE AWAY AT SHORTAGE
. . . General American Evans turning out 15 per day

Men of Industry

H. B. BROWN
. . . Inland Steel Products asst. gen. mgr-sales

WAYNE BELDEN
. . . Ajax Flexible Coupling exec. V. P.

FRANK J. SMITH
. . . V. P.-iron ore, Oglebay, Norton

H. B. Brown was appointed assistant general sales manager, **Inland Steel Products Co.,** Milwaukee. He continues direction of the metal lath products sales division which he managed prior to his promotion. Mr. Brown joined the company in 1948, and for many years previously was with United States Gypsum Co.

Thomas R. Reid was named director of the newly created office of information on government affairs for **Ford Motor Co.,** Dearborn, Mich. He has been active in governmental affairs and industrial relations, and is a vice president and member of the board of directors of McCormick & Co. Inc., Baltimore. He assumes his new duties Dec. 1.

Ellison L. Wefel was promoted to the vice presidency of **Lombard Corp.,** Youngstown. He has been chief engineer.

C. R. Brown was appointed purchasing manager, Canton, O., division, **E. W. Bliss Co.** He returns to Bliss after a brief association with Robert Carter Co., mechanical contracting firm in Toledo, O.

Frank A. Smerz, for 14 years a process metallurgist with Acme Steel Co., was named superintendent of **Greer Steel Co.'s** plant in Dover, O.

Edmund A. Watson was appointed assistant to the vice president, **American Car & Foundry Co.,** New York, to engage in manufacturing activities of the production department. He has been in plant engineering and production methods work since 1915 with both ACF and other companies.

Wayne Belden was elected executive vice president, **Ajax Flexible Coupling Co. Inc.,** Westfield, N. Y. **Charles Belden** was elected vice president. **Robert G. Cady** was made sales manager.

Inland Steel Co., Chicago, consolidated its railroad division and pig iron and coal chemicals division, and placed **John J. Davis Jr.** in charge. Mr. Davis was sales manager of the separate divisions. Named assistant managers of sales, respectively, of railroad products and pig iron and chemicals are **L. C. Reed** and **A. C. Engh.**

Solar Aircraft Co. appointed **John H. Baker** manager of its Washington office. He succeeds **Philip L. Ward,** transferred to the San Diego, Calif., plant as assistant chief engineer, development engineering division.

David F. Seymour, formerly in technical sales service for the metal industries department, **Diversey Corp.,** Chicago, was tranferred to the South Gate, Calif., plant as plant manager and supervisor of manufacturing operations. He succeeds **Eric C. Foote Jr.,** now plant manager and supervisor of manufacturing in the new plant of Diversey Corp. (Canada) Ltd., Port Credit, Ont.

Oscar D. Wyatt was appointed sales representative for the western part of Los Angeles, **Ziegler Steel Service Co.**

Harry L. Emerson was appointed vice president in charge of manufacturing, **Rockford Clutch Division,** Borg-Warner Corp., Chicago. He continues as works manager.

Frank J. Smith was elected vice president in charge of iron ore operations for **Oglebay, Norton & Co.,** Cleveland. He continues in his former position of range manager, in charge of all iron ore operations managed by the company, which responsibility also included development of taconite on the eastern end of the Mesabi range owned by Reserve Mining Co. For the present Mr. Smith will be located in the company's northern office in Montreal, Wis.

In reorganization, **Albion Industries Inc.,** Albion, Mich., elected **John Karmalski** president and general manager; **C. W. Burns,** vice president and secretary; and **R. B. Davis,** vice president and treasurer.

George R. Siegrist, executive vice president, treasurer and director of **Acheson Colloids Corp.,** Port Huron, Mich., is retiring because of ill health after 30 years of service with the company. He will make his home in Laguna Beach, Calif.

Peninsular Steel Co., Detroit, announces retirement, Dec. 31, of **Frank G. Davis,** general sales manager.

E. C. Atkins & Co., Indianapolis, appointed **Howard E. Jenkins** manager of its eastern territory with headquarters in New York. Mr. Jenkins recently resigned from Nicholson File Co. where he was assistant sales manager and assistant to the director of sales.

Edward G. Johnson, assistant purchasing agent, **Laclede Steel Co.,** St. Louis, since 1941, and an employee of the firm since 1933, was made pur-

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SPEED CLAMPS* PRODUCE 80% TIME SAVINGS 66% COST SAVINGS

FOR ALLEN ELECTRIC & EQUIPMENT CO.
Kalamazoo, Michigan

There is nothing like getting down to "shirt-sleeve" fundamentals when you are specifying fasteners. That's the way Allen Electric & Equipment Co. feel about it... as you can see from the point-blank comparison made in an excerpt from one of their letters: "We submit the following information comparing the Tinnerman SPEED CLAMP to a standard type clamp as applied to the production of our Model H-100 Kwik-Serv Oil Changer:

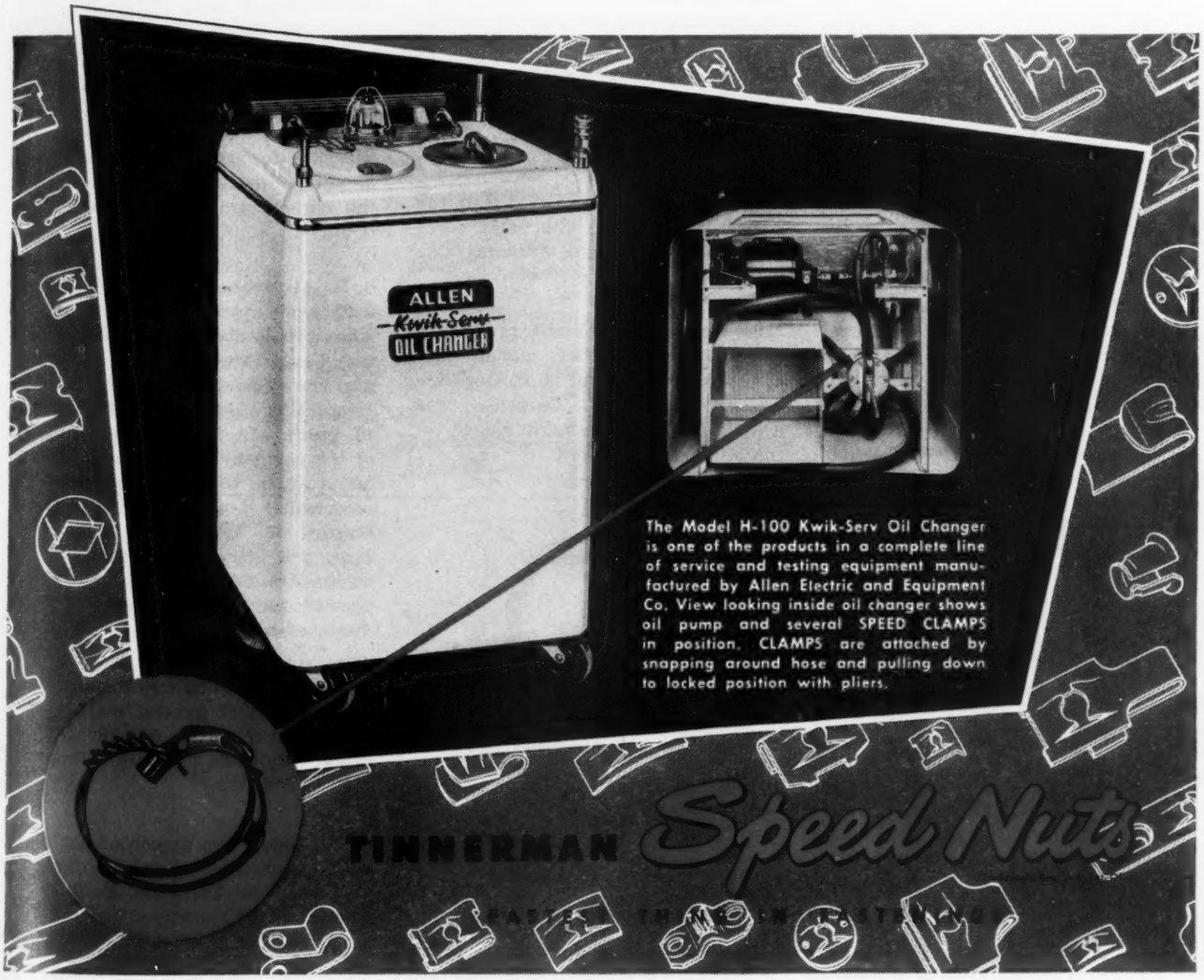
1. Tinnerman SPEED CLAMP, .0148 cents each.
2. Standard type hose clamp, .0433 cents each.
3. 15 Tinnerman SPEED CLAMPS per Oil Changer take 8 minutes for installation.
4. 15 standard type hose clamps per Oil Changer take 40 minutes for installation.

"Add to these comparisons the fact that SPEED CLAMPS have chalked up an excellent field performance record, and you'll understand why we are so enthusiastic about them."

Reports like this lead us to believe we can help you. We would welcome an opportunity to prove how SPEED NUT brand fasteners can improve your assembly cost picture. Ask your Tinnerman representative to call, and write today for your copy of "SAVINGS STORIES". TINNERMAN PRODUCTS, INC., Box 6688A, Cleveland 1, Ohio.

In Canada: Dominion Fasteners Limited, Hamilton, Ontario.

In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales.



The Model H-100 Kwik-Serv Oil Changer is one of the products in a complete line of service and testing equipment manufactured by Allen Electric and Equipment Co. View looking inside oil changer shows oil pump and several SPEED CLAMPS in position. CLAMPS are attached by snapping around hose and pulling down to locked position with pliers.

chasing agent to succeed the late **Thomas Kirk. John D. Jackson** was named assistant purchasing agent.

George W. Vaught, financial vice president, **B. F. Goodrich Co.,** Akron, will retire Dec. 31.

Richard T. Stafford, assistant to executive vice president, general machinery division, **Allis-Chalmers Mfg. Corp.,** Milwaukee, has retired after nearly 47 years of service.

Pacific Airmotive Corp., Burbank, Calif., named **Laurance H. Cooper** consultant to the management.

International Business Machines Corp., New York, promoted **John J. Kenney,** director of sales promotion, to IBM general service manager, in charge of all customer service functions of the company. **Ivor C. Armistead Jr.,** customer engineering manager in Philadelphia, becomes IBM manager of customer engineering with headquarters in New York, and **William E. Gallagher,** assistant customer engineering manager in Los Angeles, becomes administrative assistant in the customer engineering department, World Headquarters, New York.

Leslie M. Byars was appointed exclusive southern California factory representative for **Clark All Steel Welded Truck Corp.,** Rockford, Ill. He formerly operated his own firm, Modern Handling Equipment Co., Los Angeles.

Changes in executive engineering personnel at the **Gary, Ind.,** sheet and tin mill of **Carnegie-Illinois Steel Corp.,** subsidiary, U. S. Steel Corp., include transfer of **Fred K. Schefe** to Pittsburgh headquarters as staff engineer for flat rolled products, and his succession as chief engineer at Gary by his assistant, **Robert W. Holman.** Mr. Schefe has been associated 20 years with the sheet and tin mill.

F. E. Reiber was appointed assistant to the central station manager, central district, **Westinghouse Electric Corp.,** Pittsburgh. Appointments in the Atomic Power Division include: **Dr. Charles M. Slack,** formerly technical director, named assistant manager of the division, and consultant to the manager and to the technical management on research and engineering problems; and **Frank R. Benedict,** formerly industry engineering manager at Westinghouse's Pittsburgh Works, appointed director of engineering and research, responsible to the manager for the technical performance of the division.

W. P. Kirk has retired as vice president, **Pratt & Whitney,** division of Niles-Bement-Pond Co., at Hartford, Conn. Until further notice his address will be his residence, 60 Beverly Rd., West Hartford, Conn.

Addressograph-Multigraph Corp., Cleveland, elected as directors **J. B. Ward,** vice president and general manager, and **W. H. Casson,** vice president in charge of manufacturing.

Dearborn Chemical Co., Chicago, appointed **D. B. Bishop** as manager of its Pittsburgh office to replace **J. A. Crenner,** retired.

W. M. Teets was transferred from the laboratory staff to the sales force of **Hanson-Van Winkle-Munning Co.,** with headquarters in New York.

Earl Hensal was named production superintendent of tire manufacture in the Akron plant of **B. F. Goodrich Co.,** and **William L. Carpenter** was named production superintendent of the Miami, Okla., plant.

FRED K. SCHEFE
. . . *Carnegie-Illinois, flat rolled products*

ROBERT W. HOLMAN
. . . *chief engineer at Gary sheet & tin mill*

J. H. W. CONKLIN
. . . *Pangborn assistant sales manager*

J. H. W. Conklin has resigned as sales manager, Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich., and has been named assistant sales manager of the **Pangborn Corp.,** Hagerstown, Md.

Philip E. Church was appointed manager of the Canadian subsidiary, **Canadian Automotive Trim Ltd.,** Windsor, Ont., of National Automotive Fibres Inc.

David Juelss, for the last 15 years chief engineer, **American Lead Pencil Co.,** Hoboken, N. J., was appointed technical director of the firm, responsible for design and development of new products and machinery for the parent company and its subsidiaries.

S. K. Augustine and **H. Watson Paddock** were appointed comptrollers of **American Radiator & Standard Sanitary Corp.,** Pittsburgh. Mr. Augustine has been chief accountant in the comptroller's department for the last 18 years. Mr. Paddock was auditor of the company's European activities for a time, then was advanced to comptroller of these operations. **Charles R. Holzworth,** vice president and general manager, Tonowanda Iron Division, was made president of that division to succeed **B. S. Stephenson,** retired.

Howard E. Riordon was named to the new position of general manufacturing manager, radio & television division, **Sylvania Electric Products Inc.,** Buffalo.

E. K. Walsh was appointed assistant general manager of sales, **American Can Co.,** New York, and **B. R. Wood** was promoted to succeed him as manager of sales for the Atlantic division. Mr. Wood, previously assistant man-

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ager of sales, Atlantic division, is succeeded by **G. F. Henschel,** formerly a sales division manager in the Atlantic division.

James E. Fitzgerald was appointed deputy comptroller, **International Nickel Co. of Canada Ltd.,** Copper Cliff, Ont., to succeed the late **William F. Munday.**

Vincent P. Oatis Jr. was named assistant manager, electrical busway and underfloor raceway sales, **National Electric Products Corp.,** Pittsburgh.

Elected to the board of directors of **Norris Stamping & Mfg. Co.,** Los Angeles, are: **H. H. Fogwell, W. E. Cranston Jr., J. H. Pengilly, H. L. Hoffman, R. J. Merritt, Donald Royce,** and **N. W. Hagelberg.**

Richard Brown was appointed director of personnel, **Ingersoll Steel Division,** Borg-Warner Corp., at Kalamazoo, Mich. **Dee Williams** was appointed employment supervisor.

Robert M. Brown was appointed assistant purchasing agent, **National Tube Co.,** subsidiary, U. S. Steel Corp., Pittsburgh.

John L. Nolan was appointed sales representative for **A. B. Murray Co. Inc.,** to cover New York state, concentrating on the Mohawk valley and southern tier sections.

Allan W. Walter was elected comptroller, **Pullman Inc.,** Chicago. Since 1948 Mr. Walter has been with Liquid Carbonic Corp. as financial vice president.

M. D. Ayers was appointed chief engineer for **Wheeling Steel Corp.,** Wheeling, W. Va. He goes to Wheeling from the Steel Co. of Canada, Hamilton, Ont.

PAUL J. RODDY
. . . Nicholson File asst. domestic sales mgr.

J. GORDON RIDSDALE
. . . mgr. defense prod., American Dist. Steam

Paul J. Roddy was appointed assistant domestic sales manager, **Nicholson File Co.,** Providence, R. I. He succeeds **Edmond A. Neal,** advanced to domestic sales manager. Mr. Roddy, since 1947, was district manager of the metropolitan New York-New Jersey territory.

S. E. Biggs and **James A. Bardsley** were elected vice presidents of **Trailmobile Co.,** Cincinnati. Mr. Biggs heads up the manufacturing operations in company plants, and Mr. Bardsley is in charge of the Pacific Coast operations, with headquarters in Berkeley, Calif.

W. F. Weimer was named advertising manager, **Rockwell Mfg. Co.,** Pittsburgh, effective Jan. 1. He succeeds **W. A. Marsteller,** resigned to establish the Marsteller Co., marketing and advertising consultant.

Eugene K. Miller Jr. was appointed superintendent of blast furnaces at the Gary, Ind., Works, **Carnegie-Illinois Steel Corp.,** subsidiary, U. S. Steel Corp.

Growing importance of gearing manufacturing facilities to government contract work is emphasized by **American District Steam Co. Inc.,** North Tonawanda, N. Y., by appointment of **J. Gordon Ridsdale** to the newly created office of manager of defense production. He formerly was chief engineer of the company, manufacturer of steam equipment.

Charles H. Eisenhardt was named manager, electrical products sales division, **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp.

Arthur H. Lauder was appointed manager of engineering of **General Electric Co.'s** large motor and generator divisions at Schenectady, N. Y. He succeeds the late **Earle S. Henningsen.**

Charles R. Hook, chairman, **Armco Steel Corp.,** Middletown, O., leaves for Europe Dec. 7 where he will visit Armco plants and other steel companies for which Armco does consulting work. He will return Jan. 14.

OBITUARIES...

Bert E. Sandell, 46, chief metallurgist and assistant plant superintendent, **Stewart Die Casting Division,** Stewart-Warner Corp., Chicago, died in that city Nov. 14.

Joseph Edmonds, 73, superintendent, **Inland Steel Co.'s** rail mill, Chicago, until his retirement in 1944, died Nov. 13.

William M. Given, vice president, **Young & Vann Supply Co.,** Birmingham, died Nov. 10.

William D. Moore, who retired several years ago as president, **American Cast Iron Pipe Co.,** Birmingham, died Nov. 11. He became associated with the firm in 1908 and headed it since 1924.

Lester M. Taylor, 60, director of car distribution, **Buick Motor Division,** General Motors Corp., died in an accident near Norwalk, O., Nov. 12.

James J. Cundiff, 43, general manager, **Clausen Iron Co.,** Albany, N. Y., died Nov. 7. He had been associated with the firm since 1928.

Franklin Johnston, 72, secretary and purchasing agent, **Moline Tool Co.,** Moline, Ill., died Nov. 12 after an extended illness. He had been associated with the company 40 years.

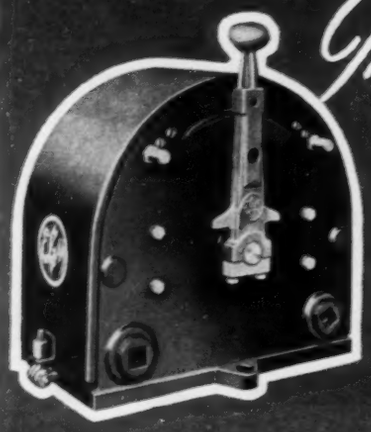
Henry T. Kuhlman, project engineer, Hunting Park plant, **Budd Co.,** Philadelphia, died Nov. 18.

James A. Creighton, 59, superintendent, steel division, **Bethlehem Steel Co.,** at the Lackawanna, N. Y., plant, died Nov. 16.

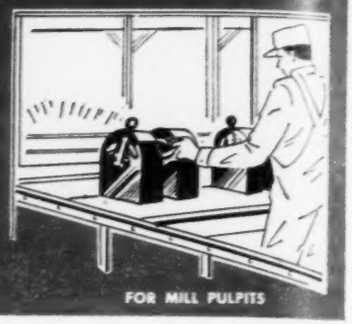
John S. Littleford, 94, a founder of **Littleford Bros. Inc.,** Cincinnati, died Nov. 12.

Charles H. Woolley, 44, assistant manager, proposition department, **Babcock & Wilcox Co.,** New York, died Nov. 11 in Cranford, N. J.

Improved CAM-TYPE SPEED CONTROL MASTER SWITCHES by E&M



FOR CRANE CABS



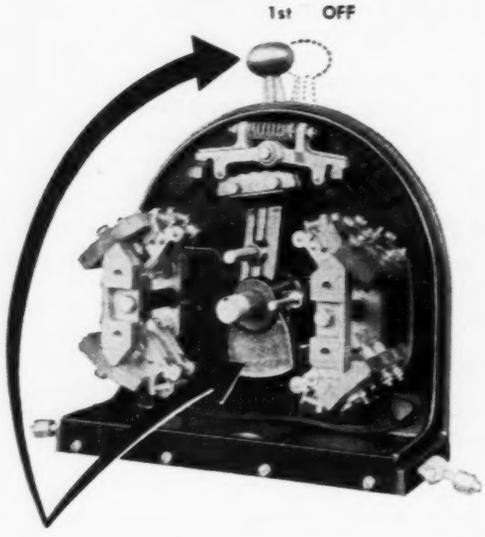
FOR MILL PULPITS

MAKE YOUR OWN COMPACT LAYOUTS with EC&M BULLETIN 1190-A CAM MASTERS

Ever popular with operators, these short-throw, narrow-width Master Switches have recently been improved, thereby increasing this popularity. The speed points are now more distinct without sacrificing ease and smoothness of operation. The views at the right show how this is accomplished.

Also, in many other ways, the EC&M Cam-type speed-control Master Switch is unmatched. Wiring space is generous—positive feed is connected to all common studs—large cams speed opening and closing of coin-silver contacts—overlapping cover excludes dust.

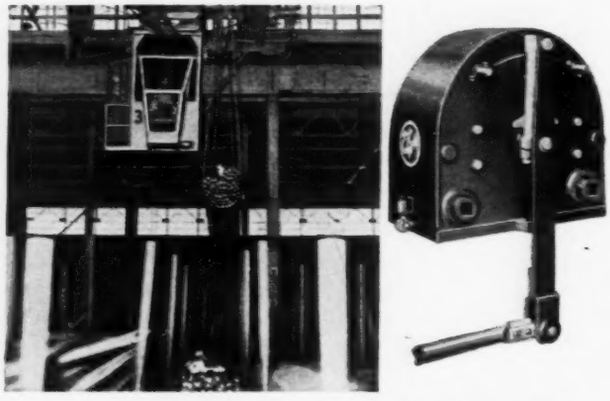
Write for New Bulletin 1190-A



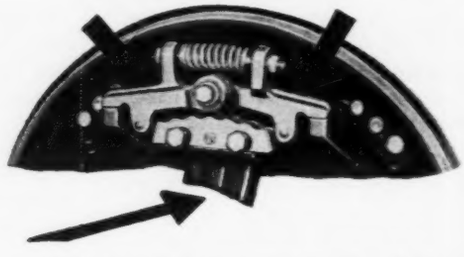
Counterweighted aluminum arm eliminates advancing of arm by itself—makes each speed point distinct.

•

Two roller rails with roller pressure adjustable and equalized in both directions of travel make inching easy—either forward or reverse.



This clear view cab crane is equipped with EC&M under-lever Cam Master Switches which are supplied with extended-arm for attaching under-bar or tube.



OFF POINT like the neutral position of an automobile gear shift lever.

THE ELECTRIC CONTROLLER & MFG. COMPANY

2698 E. 79th STREET CLEVELAND 4, OHIO

Production AND Engineering NEWS AT A GLANCE

MATTER OF KNOW-HOW— Hot forming magnesium aircraft components is feasible if proper heating equipment is used, geared to production speed. (p. 56). Also magnesium sheet can be hot formed at less cost because many parts formerly formed in two parts, then welded now can be stretch formed in one piece. Tests at Douglas Aircraft show that sheet temperature is the most important variable. Die temperature is not critical and parts are successfully formed with die temperatures as low as 130° F.

MATHEMATICS "FACTORY"— At National Bureau of Standards' Washington computation lab, many important scientific and engineering problems are solved by a new high-speed automatically-sequenced electronic computer. But those that are too large for manual computing methods, yet not large enough for practical use of the electronic unit, are handled on new type punched card machines. The latter "read" several numbers from each card, perform a prescribed sequence of additions, subtractions, multiplications or divisions and punch one or more answers on unused portions of the cards. The new "tools," which process cards at a rate of 100 per minute, help the agency in performing computations requested by federal organizations, universities and private industry. They also aid in continuously creating a stockpile of mathematical tables for facilitating such computations.

HAVING POWER TROUBLE?— If you are experiencing trouble with overloads, now is a good time to revise your electrical wiring systems (p. 59). Today's technical developments make it unnecessary for your power dollars to die out on the line. Also you don't have to build a new plant. J. L. Wagner of Westinghouse says plants needing systems to meet increasing loads can have them quickly and economically. One quick way of doing the job, he points out, is to use modernized bus duct.

SUPER EMPLOYEES— Some automotive assembly and manufacturing operations are too complicated and fast moving for the human mind and eye to follow. But mechanical super employees—electronic control and calculating devices—keep things running smoothly. They operate machines, sometimes entire production lines almost automatically. One assembly plant equipped with such units controls 42 separate conveyors, 24 on the main line and 18 feeders that carry parts and supplies. Another uses electric "brains" to digest thousands of varied car orders and translating them for production control. The system permits the company to produce a geometric total of 14,000 different combinations of body style, color, trim and accessories. Customers can have a choice of 32 body designs, 15 colors, 30 upholstery fabrics and 21 different accessories, and cars come off the line made to order.

TITANIUM RESEARCH PUSHED— Weight savings in aircraft through use of titanium is one of the important reasons the Air Force is concentrating more research effort on the metal (p. 60). The service just initiated two research projects on this new metal which makes possible 40 per cent reductions in weight in some instances. One of these involves the design of a complete wing for a supersonic missile, the other calls for the design and fabrication of a complete aft fuselage section for a jet fighter The latter is to include titanium forgings, rivets as well as sheet material. Both projects are expected to reveal valuable data on high-temperature and corrosion resistance.

CONTAMINATION-PROOF SYSTEM— Problem of delivering lead chromates from dryers to storage without spillage or contamination is solved by "zippered" conveyor belts at the Chicago plant of Sherwin-Williams. The company uses one belt for each color. After drying, the hot materials are chuted directly to a belt which is "zipped up" by closing rollers immediately beyond the feed points. Traveling at a speed of only 5 feet per minute, the belts handle 750 pounds per hour. The longer of the two conveys horizontally for 59 feet, rounds a curve and elevates for 37 feet on a 30-degree slope, then travels 87 feet to the discharge point located on the roof of the building.

GLAZE DOES IT— One reason why semisilica refractory brick is resistant to structural spalling is that it checks slag penetration (p. 62). According to G. Bickley Remmey of Richard C. Remmey Son Co., checking is due to a glaze condition. The brick itself has a low glass content but its composition is so close to eutectic that only a small pickup of fluxes is necessary to fuse the surface.

STATISTICS PROVE RELIABILITY— If a test method gives results that are erratic and unpredictable, it cannot be considered to be reliable. Grant Wernimont of Eastman Kodak Co., Rochester, N. Y., says the reliability of a test method can be studied by planning a series of determinations so that individual results can be grouped in some logical way. A test method can be considered accurate when it gives measurements on a sample of test material which do not differ from the known value by more than can be explained by random variations of the method. Results of properly designed experiments to establish the reliability of a test method, he says, can be studied profitably by the use of simple statistical control charts. Test method precision and accuracy also can be evaluated with the help of this technique.

Magnesium Sheet Hot Formed At Less Cost

Tests at Douglas Aircraft show that staging operations in drop hammer forming can be eliminated. Parts formerly formed in two parts and then welded can now be stretch formed in one piece

By GILBERT C. CLOSE

HOT FORMING of magnesium aircraft components is feasible if proper heating equipment is used, geared to production speed. Douglas Aircraft engineers proved that point in a series of tests conducted on drop hammer and stretch press forming techniques.

Elimination of staging operations in drop hammer forming and the ability to stretch form parts in one piece will in many cases result in production savings and better parts. Cost for all other operations tested will probably be higher because there are no forming advantages to offset the additional heating and tooling charges.

Data gathered in these initial tests were used by Douglas engineers to design a portable production plate-type heating oven in which the sheets will be clamped between two heated platens. A portable oven for heating formed parts is also being planned to provide a means of conveniently heating the parts requiring additional forming or hand work.

Forming Limitations Studied—Purpose of the tests was to determine forming limitations, best methods of preheating the sheet, heat ranges and other factors that would influence design, tooling and production.

Because magnesium alloy FS-1 is considered the most suitable for aircraft sheet metal parts—except where gas or arc welding is involved—this alloy in the annealed (FS-1a) and hot rolled (FS-1h) state was selected for the tests. It was found that FS-1a can be formed at temperatures as high as 650° F

Aluminum slab used for contact heating magnesium sheet. Slab was heated with gas-air torches. Surface pyrometer controls the temperature

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without affecting its strength, but that FS-1h loses strength when formed at temperatures above 325° F. Since most of the material on hand was FS-1h and since interest was primarily in forming limits, tests on both the annealed and hot rolled materials were conducted at temperatures up to 600° F. Gages tested ranged from 0.040 to 0.125.

Drop Hammer Tests—Because tests were to be run with a minimum of expense, special tooling and equipment were immediately precluded. That meant that a simple but effective method for heating the magnesium sheet must be devised. Heating must be accomplished as near the drop hammer as possible to prevent heat loss during transfer of the sheet to the hammer.

At first, a large flat Kirksite slab was tried. It was heated to the desired temperature with gas-air torches. But it was discovered that the metal softened locally at about 475° F, so an aluminum slab was substituted that could be safely heated to about 650° F. Surface pyrometers were used for measuring slab temperatures.

After the slab was heated to the desired test temperature, the magnesium sheet to be formed was placed upon it, covered with asbestos sheet and held firmly in contact with the slab by weighing it with lead pigs. Good contact between the magnesium sheet and slab was necessary for rapid and uniform heat transfer.

Double Curvature Skin—Dies for the drop hammer tests were selected from production dies to represent the most severe conditions expected in the applications being considered, such as deeply pillowed double curvature inner skins for doors and cowlings.

Die bottoms were heated in place, using gas-air torches, a slow but effective method for experimental work. From one to two hours of heating was required to bring the die to desired test temperature. Temperature of the bottom Kirksite die had to be kept under 475° F or local softening would occur.

To obtain the highest possible temperatures of the lead top die, a new top was poured prior to the test and the die installed and used as soon as it was sufficiently solidified. Despite that method, temperature of the top die would drop below 300° F before the test hit could be made. The variance in die temperatures and especially that of the top die was found to be of little consequence during forming since the time of overall contact with the sheet during the hit was only a fraction of a second.

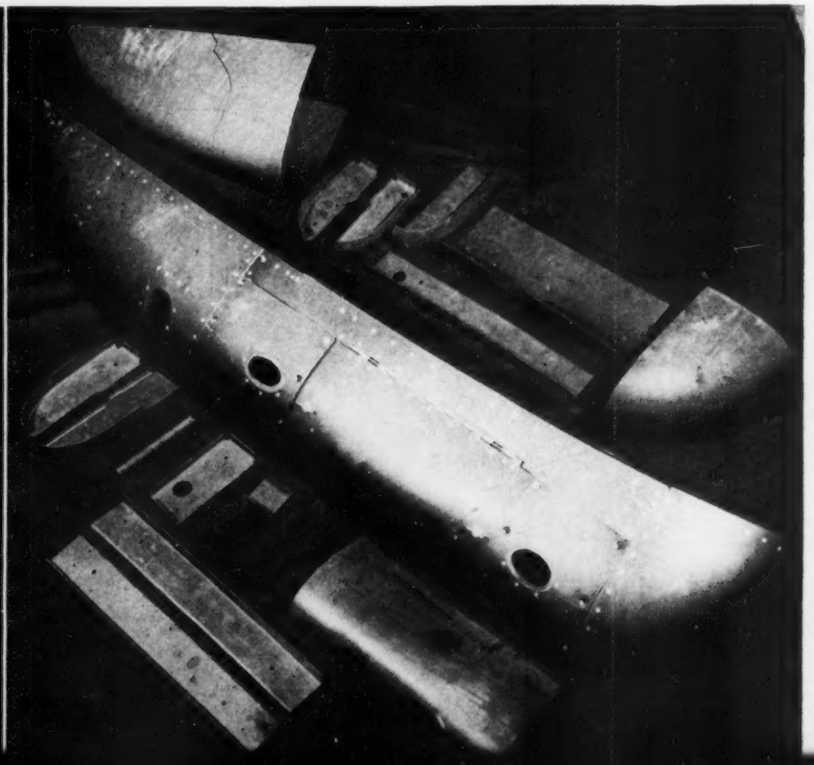
High Heat for Slow Forming—In one case, the hammer dies were heated to their maximum possible temperature to try a method of slow forming. The die selected for this test was the final one of five staging dies used in forming an aluminum part. The idea here was to let the top die form the part as far as possible under gravity pressure, accomplishing finish forming in a single hit. This method worked in all cases tried, but further experimental work showed that the same part could be formed in a single blow if slightly higher sheet temperatures were used.

Hammer tests were run at various combinations of sheet and die temperatures. It was discovered that acceptable parts could be formed in all the test gages of FS-1a and FS-1h with initial sheet temperatures (at the heating slab) ranging from 450° F for the heavier gages of FS-1a to 600° F for the lightest gages of FS-1h. Annealed sheet required somewhat lower forming temperatures than cold-rolled sheet in the same gage.

Small Springback — In all hammer forming tests,

Left—This inner door panel, deeply pillowed and incorporating compound curvature, was successfully hot formed in a single stroke of the drop hammer

Below—Bomb rack fairing (top) stretch formed in one piece from magnesium. When fabricated from aluminum (bottom) fairing had to be formed in two parts, then welded



Complete bomb rack fairing and the many components from which it is assembled. Nearly all metal forming methods were used in hot forming these magnesium parts

sheet temperature proved to be the most important variable. Die temperature was not critical, and parts were successfully formed with die temperatures as low as 130° F. The main contribution of the heated dies was to reduce heat absorption from the sheet during the few seconds it was in contact with the die prior to striking.

Heat losses from the sheet during transfer from the heating slab to the hammer die was found to be small, even with the lighter gages. This proved the advisability of locating heating equipment very close to the hammer area.

Springback in the hot formed magnesium sheet was very small, but wrinkles were prone to form in the lighter gages making planishing necessary. Subsequent heating for planishing was necessary as even the annealed material was too hard for hand working at room temperatures.

Stretch Press Tests—The excellent results obtained in hot forming on the drop hammer encouraged a series of severe hot forming tests using a Douglas-designed 50-ton stretch press. Test dies were mounted on the stretch press and insulated from the loading bar with asbestos sheet. Gas-air torches were used for die heating. The same slab setup used in the drop hammer tests was used for sheet heating, but it was soon discovered that sheet heating was a useless operation because the sheet would cool to room temperature during the time required to mount in the machine grips.

Dies at 300-600° F — Sheet used for the stretch forming tests was 0.051-inch FS-1a and 0.040-inch thick FS-1h annealed for 30 minutes at 600° F. Before stretching, 1-inch squares were ruled on the visible side of the sheet so stretch distortion could be visualized. Stretch dies were lubricated with Ultra Vis No. 32 which would retain lubricating properties as the maximum temperatures used. Many tests were run with the die temperatures ranging from 300 to 600° F.

Distribution of the stretching was the most difficult factor to control. Normally, deformation tended to be greatest in the hottest portions of the sheet, which in turn were those portions in closest contact with the heated dies. Very little distortion occurred in the sheet skirts (the area between the machine grips and line of contact with the die).

Stretch Distribution Hard to Control—At first, attempts were made to relieve this condition by cutouts at the middle of each skirt. That helped to some extent, but great care had to be exercised in locating the cutout to prevent wrinkling and tearing during stretching. Next, the sheet skirt was heated with gas-air torches just before stretching. The method failed because of difficulty of temperature control. Banks of infrared lamps were then tried, but wouldn't raise sheet temperature sufficiently.

Last and successful step was recasting the die, adding a longer die skirt that could be heated and that would heat the sheet skirt area during stretch forming. It provided equal temperature throughout the sheet with consequent equal deformation in all areas. When stretch formed by that method, the sheet conformed exactly to the die, with no springback, providing an aerodynamically clean surface.

Experimental Assembly Fabricated—To round out the test program, all parts for a complete bomb rack fairing were formed and assembled. It involved drop hammer, stretch press, punch press, brake, hydropress and dimpling operations, and served to give all departments concerned experience in hot forming.

Dies of the punch press were used cold, with the unannealed FS-1h sheet heated to 450° F just prior to forming.

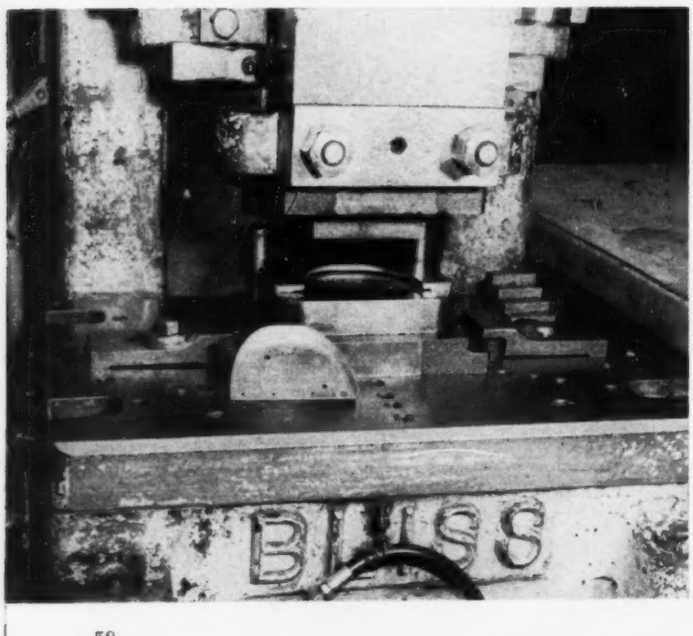
In hydropress forming, because of the relative slowness of the operation, a hot form block was used with the magnesium sheet used cold. The heated form block was placed on asbestos to prevent rapid loss of heat into the press bed. Both the form block and magnesium blank were covered with a rubber blanket to protect the large rubber blanket in the hydropress ram. In a production program, heat resistant rubber compounds are available. Parts hot formed on the hydropress were satisfactory.

Brake forming was accomplished by simply torch heating the dies and preheating the sheet.

Next, Dimpling—Dimpling was necessary before assembly of the fairing. It was accomplished on the same electrically heated dimpling dies used for 75-ST aluminum alloy sheet. Slow, continuous application of the dimpling pressure was found to work best, with the die heated to give a dimpling temperature between 200 and 350° F, depending upon the gage.

Tests did not cover the complete range of problems that would be encountered in full-scale production with magnesium. But the tests served their purpose in permitting shop personnel to become acquainted with the material and to indicate some of the factors to be considered in planning to fabricate magnesium alloys on a production basis.

Punch press setup used in forming one fairing component. Punch dies were heated, while sheet was used cold. In the slower forming operations, hot dies were necessary to offset heat losses from the sheet during setup and operational phases of forming. All photos courtesy El Segundo plant, Douglas Aircraft Co.



PLANNED POWER: ANSWER TO OVERLOADS

Efficient electrical performance and planned wiring systems can be had without modernizing the whole plant. One quick, economical way of doing the job is by using modernized bus duct

HAVING power trouble? If you are it's possible someone in your plant has fallen down on the job.

Today's technical developments make it unnecessary for your power dollars to die out on the line. Nor is it necessary for you to build a new plant. The answer to rising costs plaguing many operators is planned power.

The trouble with many of today's industrial plants, according to J. L. Wagner of Westinghouse Electric Corp., is that wiring systems were never modernized to keep pace with the increased heavy loads over the years. As a result, he told engineers at a demonstration held at Newark, N. J., lighting levels today have decreased and motors and other productive tools are operating at greatly reduced efficiency.

Industrial plants, he says, can have their wiring systems quickly and economically modernized with bus duct which is nothing more than a simple arrangement of copper conductors enclosed in a duct, or steel enclosure.

Just Like Home—Convenient receptacles located at 12-inch intervals on alternate sides so that plug-in circuit protective devices can be easily installed or quickly changed from place to place make power as readily available in industrial plants as convenience outlets in the home.

In planning a bus duct system for a mythical plant, Mr. Wagner stressed that provision must be made for present load and additional capacity to take care of normal expansion for increased business.

The total connected load for this plant is 500 amperes. The nature of the operation is such that there are extended periods when most of the electrical equipment is in operation at the same time. Since the demand is high, it is better to be safe and assume 100 per cent.

Analysis of this operation indicates that a load expansion not to exceed 50 per cent may be expected over the years. The present connected load of 500 amperes has been determined. A 50 per cent increase over this value would be 750 amperes. The nearest commercial size copper bus bars conforming to this figure is 800 amperes. So, determining that, 800 amperes should be the capacity copper conductors in the bus duct system.

That brings up another question. The main switch is admittely too light for the job. Shall it be replaced with a similar device of heavier capacity? He thinks it isn't necessary. The device is only approved by the NEC in capacities to 50 hp. For applications exceeding 50 hp it is plainly marked "Do Not Open Under Load." In the mythical plant we have a very heavy inductive load that indicates the need for a high interrupting capacity main disconnecting device.

Standardized Parts Desirable—So now remove the fused switch and install a high-interrupting capacity, DA air circuit breaker, enclosed in a cabinet with a dead front handle that is fully indicating. From the main disconnect, install a bus duct system, entirely of standardized parts received from the manufacturer, at a great savings in both time and expense:

First, connect the standardized flange section into the circuit breaker pull-box. This is the beginning of the vertical riser, the purpose of which is to get the bus duct system up out of the way.

The next item is a standard section of 800 ampere bus duct whose installation completes the vertical riser of the bus duct system.

Next, is a standard elbow which is connected to the end of the vertical riser. This unit starts on to the horizontal section of the bus duct system.

And finally are installed the horizontal sections of this 800 ampere plug-in bus duct system, the entire length of the production line.

These standardized units fit together like pipe and fittings. Insulated plug-in openings are spaced at 12-inch intervals on alternate sides of the duct. From these points circuit protective plug-ins supply energy to the motors and the plant's other productive equipment. Many operators prefer the circuit breaker plug-in. With circuit breakers there is nothing to renew or replace.

First, is installed the plug-in and cable to the 10-hp motor and next comes the plug-in and cable to the 3-hp compressor drive. Then to the electric oven; now to the lighting panelboard, and finally the plug-in and cable to the machine tool drives. This completes the bus duct system.

Advantages Of Bus Duct—Bus duct has many advantages over conduit and cable. It brings power direct to the drive. With bus duct, new circuits can be quickly added or old circuits changed to new.

A small investment in capacitors may not only pay for itself in reduced power bills in a short period of time, but additional loads can be added without adding new bus duct, new transformers or incoming leads. There are also added benefits in better voltage regulation, with increased efficiency to lighting, heating and power loads.

Other factors, equally important for profitable operation, are safety and continuity of service.

There is no single electrical problem that is of more universal and vital importance than that of protection. Protection of motors, the machines they drive, the workmen who operate them, in short, the protection and insurance of uninterrupted production is necessary in successful operation of any business.

As far back as 1922 Westinghouse research engineers set to work on the problem. In 1927 they produced the solution which was an entirely new method

of extinguishing electric arcs—the De-ion principle of arc interruption embodied in the De-ion quencher.

Quicker Than a Wink—Of course, no one has ever seen De-ion grids extinguish an electrical arc. The reason for this is that the entire quenching operation occurs in one-half cycle—or 1/120 of a second—ten times as fast as you can blink your eye. The large hot arc is split into smaller and cooler arcs, eliminating the intense heat which burns contacts and operating parts in devices using conventional extinguishing methods.

But the research engineers recognized that extinguishing the arc was only half the problem. The other half was to develop a device which would determine the exact moment when the De-ion arc quencher should be set in operation. The solution to this problem again, as in the case of the De-ion arc quencher, called for the development of an entirely new thermal-magnetic principle of operation. The vertical member is the bimetal which provides the necessary time delay so that the circuit will not be interrupted on momentary safe overloads such as might be caused by motors starting under heavy duty.

The bimetal consists of two dissimilar metals. One is an inert metal that is not affected appreciably when heat caused by an electric current passes through it. The other is a very active metal which expands, or lengthens when heat is applied. Since these metals are bonded together, as the current increases, the heat will cause the more readily expansible metal to push against the inert metal causing the bimetal strip to bend. At an exact point of calibration, the bimetal disengages the tripping latch and the contacts open instantly.

Lightning Speed—The second important feature of the thermal-magnetic device is its magnetic action. The magnet with its hinged armature causes the breaker mechanism to trip with lightning speed under short circuit conditions.

The magnetic trip is set to open the breaker contacts at current values ranging from 12 to 14 times the normal rating of the breaker. These trip-out times have been determined as the result of tests made of motors under locked rotor conditions.

In the operation, the armature hits the trip bar releasing the latch which causes the moving contacts to open—thus (trip breaker). Tests have proved that this action will clear the circuit under high short circuit conditions in as little as one-quarter of a cycle on 60 cycle current—that is 1/240 of a second!

The unit's thermal element in combination with the magnetic element provides the necessary time delay to prevent needless outages, but when currents rise to dangerous values, the magnetic action takes the breaker out instantly. The combination or wedding of these two principles is utilized throughout the AB De-ion circuit breaker line. This principle has been refined to the point where today it is the accepted principle in the construction of all breakers.

Thus the De-ion thermal-magnetic breaker is not just another protective device. It is the complete answer in protecting electrical circuits. Best of all, there is nothing to renew or replace before service can be restored.

USAF Tests Titanium

Current Air Force research may result in wide use of titanium alloys in the airframe structure of supersonic aircraft and missiles. Immediate use of the metal centers on substitution for stainless steel.

TITANIUM, sometimes referred to as "the world's most neglected metal," is anything but neglected by Air Force engineers in their search for aircraft structural materials. Structural components such as wing and fuselage sections are in the experimental stage, while nonstructural components, such as de-icing ducts, fittings and firewalls are now in production.

Since the beginning of the titanium development program, engineers of the materials laboratory, engineering division at Air Materiel Command Headquarters, have been busy improving production processes used in titanium reduction, and developing better titanium alloys. In co-operation with Battelle Memorial Institute, Columbus, and other Air Force contractors, the materials lab has produced a large number of experimental titanium alloys.

One of the results of this development is the present method of melting titanium in a water-cooled copper crucible. Another is a method of continuously reducing and melting the titanium in the production process. This is a big step toward lowering the production cost and simplifying the refining process.

On the fundamental side of the development program, a phase diagram investigation is being conducted. In the latest *Technical Data Digest*, the Air Materiel Command says the results of this research are expected to contribute a great deal to the understanding of the fundamental properties of titanium alloys and their heat-treating processes.

All-Ti Alloy Wing—Two research and development projects on titanium structures for aircraft and missiles have been initiated by the engineering division's aircraft laboratory. One of these is the design of the complete wing for a supersonic missile. This project is directed toward obtaining a high-temperature-resistant, structurally efficient missile component, completely constructed of titanium alloys.

The other project calls for the design and fabrication of a complete aft fuselage section for a jet fighter, replacing all corrosion-resistant, steel-alloy materials with titanium alloys.

The fuselage section will include titanium forgings and rivets as well as sheet material. This procurement will provide a primary structural aircraft component capable of operating at elevated temperatures, and will also provide experience in establishing design criteria, service test data, and fabrication techniques.

It's 40% Lighter—The extreme interest in titanium and titanium alloys springs from the fact that wherever it is possible to substitute titanium, gage for gage, for stainless steel, a 40 per cent saving in weight results. Portions of aicraft structures immediately surrounding jet engines, tailpipes, etc., and particularly afterburner installations, must in

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...in Airplane Structurals

many cases be fabricated from a corrosion and heat-resistant steel.

Titanium is one of the seven most important and potentially plentiful metals having a melting point higher than iron, nickel, and cobalt from which present commercial heat-resistant alloys are made.

How Does It Stack Up?—Engineers of the materials laboratory's metallurgical branch have been comparing the properties of titanium and its alloys with those of aluminum and magnesium alloys and steel. Here are some of the things they found:

At room temperature, as indicated by yield and ultimate tensile strength, unalloyed titanium is superior to magnesium and aluminum alloys, carbon steels, and annealed 18-8 stainless steel. Only heat-treated alloy steel and cold-worked stainless steel show greater strength than unalloyed titanium, and only heat-treated steel is similar in strength to a high-strength titanium alloy.

On a strength-weight basis, cold-worked titanium and titanium alloys are equal to or superior to the best of the other materials.

A comparison of the elastic buckling of slender and wide columns on a strength-weight basis indicates that titanium is superior to steel but inferior to aluminum and magnesium alloys. Titanium has a useful creep strength at temperatures as high as 1000°F; aluminum and magnesium alloys do not have any useful load-carrying ability at temperatures above 600° F. In fact, titanium is stronger at 800° F than either aluminum or magnesium alloy at only 400° F.

Available creep data for titanium containing small but undetermined amounts of carbon, oxygen, nitrogen and tungsten show it to possess properties that are intermediate between those of the best aluminum alloys and steel.

Limit of the metal's applicability depends largely on its working and handling characteristics. Some of these are listed in the accompanying box.

Wanted: Low Cost Process—A definite effort is being made by the Air Force to assure the availability of titanium for use in military aircraft. Little or no work on the production of titanium existed three years ago. One manufacturer is now producing 125-pound ingots and sheet 24 inches wide and 7 feet long. The approximate price for sheet is $20 per pound, although it is expected that the price will drop in the near future.

Air Force engineers point out that there is a definite need for a simple, rapid, and inexpensive method of producing titanium metal from the basic ores. The Kroll method of magnesium reduction of titanium tetrachloride for the production of ductile titanium metals is used by Bureau of Mines. It is considered most practical for large scale operations.

In the Kroll process, titanium tetrachloride is added to a bath of molten magnesium in a metal crucible in an atmosphere of an inert gas, such as purified argon. The crucible is heated externally to about 1000° C. The metal is separated from the magnesium and magnesium salts by leaching and acid treatment or vacuum distillation. The yield is then melted in a vacuum arc furnace similar to the Von Bolten furnace used for melting tantalum. Metal reduced in this manner is reported to have a purity as high as 99.8 per cent.

Purer than Ivory Soap—The most pure and ductile titanium is produced at the present time by the iodide process. In this method, crude titanium, of fairly high purity, is refined by subjecting it to iodine in an evacuated container to form volatile iodides that are decomposed on a heated tungsten or titanium filament. A coherent deposit of titanium builds up on the filament until ¼ to ½-inch diameter rods are produced. As the titanium iodides are decomposed, iodine vapor is liberated within the system and returns to react with more titanium metal, thus acting as a carrier of metal to the hot filament. Titanium of 99.9 per cent purity can be produced by this process.

Even though the iodide process is not adaptable to large-scale production at present, in addition to being too costly, the pure iodide titanium is extremely valuable in research as a basis for fundamental work on high-purity alloys.

Plenty of Room for Improvement—One of the big differences between the iodide and the Kroll processes is that the latter produces a powder or sponge that must be consolidated for fabrication. The Bureau of Mines has used conventional powder metallurgy methods, pressing the clean, ground powder into compacts at 50 tons per square inch pressure. The compacts are sintered for 16 hours at 1000° C in vacuum and worked by cold-forging.

Despite the satisfactory products that can be produced by powder metallurgy, consolidation of titanium by melting is necessary to produce a metal suitable for the large-scale production of sheets, bars, and other shapes.

TITANIUM'S WORKING AND HANDLING CHARACTERISTICS

BENDING AND FORMING—Annealed titanium in sheet form, 0.020 to 0.070-inch thick, will take a 2 times thickness minimum bend radius. It appears to be practical to brake-form titanium, but considerable development work remains to be done on drawing, cupping, spinning, die-forming, hammer-forming, and extruding.

MACHINABILITY—Preliminary tests indicate that machining of titanium is similar to that for austenitic stainless steel.

WELDING—Titanium can be readily spot, seam, and inert-arc welded to other pieces of titanium. Other types of welding, brazing, and soldering not yet developed, and no experience seems to be available with welding titanium to other common structural materials.

FORGING—Commercially pure titanium is readily forged within the temperature range of 1600°-1800° F.

ANNEALING—Commercially pure titanium can be satisfactorily annealed by heating in air at 1300° F for one hour. Exposure to a temperature of 800° F for 1000 hours removes cold-worked properties from titanium. As with other metal, shorter times at higher temperature also removes the cold work.

IDENTIFICATION—A convenient method for distinguishing titanium from other metals is to moisten the piece and use it to mark on glass. Titanium moistened with water or saliva will write on glass with reasonable pressure.

Semisilica Refractories Lessen Furnace Structural Failures

These brick, having high resistance to structural and thermal spalling and low resistance to plastic flow, are making excellent service records in kilns, soaking pits, forging furnaces, heating furnaces of all types, hot metal mixers, open-hearth furnace checker linings and fan tails, and blast furnace stoves

By G. BICKLEY REMMEY
Richard C. Remmey Son Co.
Philadelphia

PROPERTIES of semisilica brick that have led to their continued use despite their determination to hide their light under a bushel are: High resistance to structural spalling and high resistance to plastic flow at temperatures encountered in recommended uses.

While structural spalling is the most common form encountered, semisilica brick practically never spall. They can last many times longer when used in conditions that cause structural spalling troubles with regular high-heat duty brick. On the other hand, if trouble is thermal spalling the use of semisilica brick would give reduced life. So it's important to understand and be able to recognize the difference between thermal and structural spalling.

Different Types Of Spalling—ASTM lists three different kinds of spalling.[1] (1) Mechanical—caused by mechanical means, such as pinching off the ends of bricks by failure to provide room for expansion. (2) Thermal—caused by the brick being subjected to thermal changes. (3) Structural—caused by a change in the brick's structure brought about by additional heat treatment, slag absorption or both.

An ideal case of structural spalling is one in which the heated end of the brick expands from absorbing and reacting with furnace fluxes to the point where the expanded hot end tears itself loose. See Fig. 1. This sometimes occurs in continuous kilns. Typical and more common structural spalling takes place in furnaces where the brick are exposed to moderate thermal fluctuations that cause spalling after some structural change has taken place.

If the spalling did not occur without the refractory first changing its structure, it is structural spalling even though a thermal fluctuation did cause the altered part of the brick to separate. It is usually not hard to recognize the structural spalling. If you examine the spalled pieces or hot ends of brick that are about to spall, you can notice the change in structure. In clay brick the altered part will be more vitrified, expanded or shrunk.

Another thing that should be observed to help diagnose a structural spalling case is the time it takes place. Structural spalling will not take place soon after the new brick work is put in use because it takes time for the hot ends to undergo a structural change. But after the structural change takes place, the spalling will be quite rapid.

Panel spalling tests were very successful in evaluating clay brick and led to attempts to use it for semisilica refractories. Some of these tests were rather low and some show over 10 per cent loss. Regardless of these results they have all performed well in service without undergoing the usual structural spalling that all clay brick are inclined to do.

Results of panel tests like the other standard tests bear no relationship to the spalling behavior of semisilica refractories in service. When we consider what the test does and how clay and semisilica brick behave under these conditions, it is easily understood.

From paper presented at the Symposium on Refractories, Alfred University, June 27, 1950.

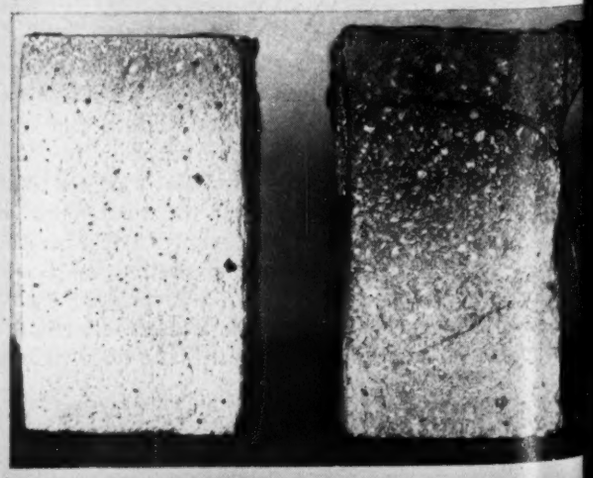
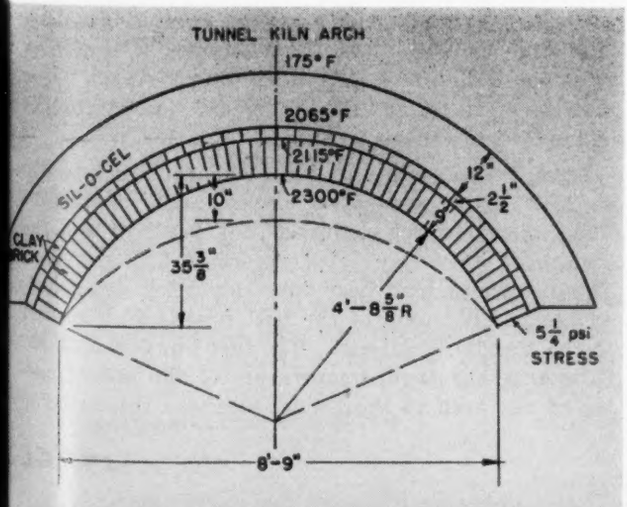


Fig. 1—Illustration of structural spalling. Left is semisilica brick and on right is high heat duty brick. They were removed after reheat of panel spalling tests at 2912° F. Spalling of high heat duty brick is apparent. The high heat duty specimen that was used in this test is more subject to structural spalling than most high heat duty brick

Panel Spalling Test Procedure — The panel test consists of two parts. First a preheat at 2912° F for 24 hours to develop a structural change in bricks of low resistance to structural change. No slag or fluxes are used in the test, so if the brick do not contain detrimental impurities and are properly made they will not be seriously affected by this treatment and will show up well in the test. Second part of test subjects the brick to 10 cycles of sudden thermal change that clay brick can stand unless it was seriously affected by the preceding preheat treatment.

When semisilica refractories are put through a panel test, the preheat part of the test does not make them any more likely to spall because they have such a high resistance to structural spalling.[2] But the thermal shock cycles are severe enough to cause spalling in various amounts. The important thing to remember is thermal shocks in this test are much more sudden than those encountered during any semisilica refractory service. That's all right with clay brick because they will stand the shocks unless they have been structurally changed in the preheat. But this is not so with semisilica refractories as the only effect the panel test has on them is one of thermal spalling, which is much more severe than ever required in service conditions where semisilica refractories are recommended. High-heat duty clay brick are much more resistant to thermal spalling, while semisilica brick are much more resistant to structural spalling.

Structural Spalling Theory—Greatest destructive agent of refractories is slagging or the low melting fluxes present in all furnaces fired with low priced fuels. When regular clay brick, super duty or higher alumina brick are used in such furnaces, these fluxing constituents contact the surface of the brick, if not by direct contact, by means of fly ash or vapor. These low melting glazes or slags are drawn into the clay brick to a depth depending on the temperature gradient through the wall and the melting point of absorbed glazes. After a significant amount of this glaze is absorbed by the brick's hot end, the original composition is naturally altered. It has a lower fusing point, different thermal expansion, different specific gravity, and different porosity. In short, the hot end has changed both its composition and structure. This takes place at a much lower temperature than would be suspected by a study of spalling test results where slags or fluxes are not encountered.



One of the important differences in semisilica brick is illustrated upon examining their use in a reheating furnace. When used in furnaces of this type they react entirely different. In this case the slag or fluxes in the furnace would contact the brick, but surprising as it may seem, they would not soak into the brick. It accumulates on the surface and reacts with the hot face, forming a glazed surface. As the fluxes on the surface increase with time, slag will run down the brick's surface. Of course, this slag takes with it some of the brick which is dissolved at the surface only. The semisilica brick wall or roof wears back evenly without spalling. The structure of the wall does not change to one that will spall more readily than the new brick.

Quartz Particles Converted — Chesters has noted this same property in semisilica brick used in England.[3] The only change that takes place in semisilica brick on heating is the conversion of some of its quartz particles to cristobalite and tridymite. This does not materially change their resistance to spalling. The porous structure of the brick tends to absorb the expansion, without rupture, as it slowly develops. This phenomenon is peculiar to semisilica brick and is quite clearly described in the paper entitled, "Comparative Spalling Test—Structural Spalling—On High Heat Duty Clay Brick and Semisilica Brick."[4]

Protective Glaze Theory—We have mentioned that one important reason for semisilica bricks' resistance to structural spalling is because slags and fluxes that normally soak into other refractories are confined to the surface of these brick. The reason for this is of interest, even though further studies may necessitate some revision. The low glass content of the brick, no doubt, has an important influence on this condition. However, the most important factor in checking slag penetration probably is the fact that the surface of semisilica refractories becomes covered with a glaze very high in silica. The composition of these brick is so close to the eutectic that only a small pick-up of fluxes is necessary to fuse the surface.

In other words, the glaze or glass in direct contact with the brick's surface is composed essentially of the brick plus just enough flux to make it fuse into a glass. This glass has a high viscosity because of its high silica content. It forms a protective glaze or coating that is slow to react with the brick on one side and the more fluid slag accumulating on the other side. In fact, the viscosity of the protective layer is probably so high that it would not penetrate any type brick unless it reacted with the brick to form a more fluid glass.

Refraction Index Determinations—Petrographic examination showed the outer slag to be considerably higher in iron than the protective coating. Index of refraction determinations are: Outer coating of slag —1.502; protective coating—1.485; fused quartz—1.462. This examination as well as the visual inspec-

Fig. 2—Construction of tunnel kiln arch at heat zone. Dotted line indicates approximate position of arch after 10 years service when lined with high heat duty clay brick

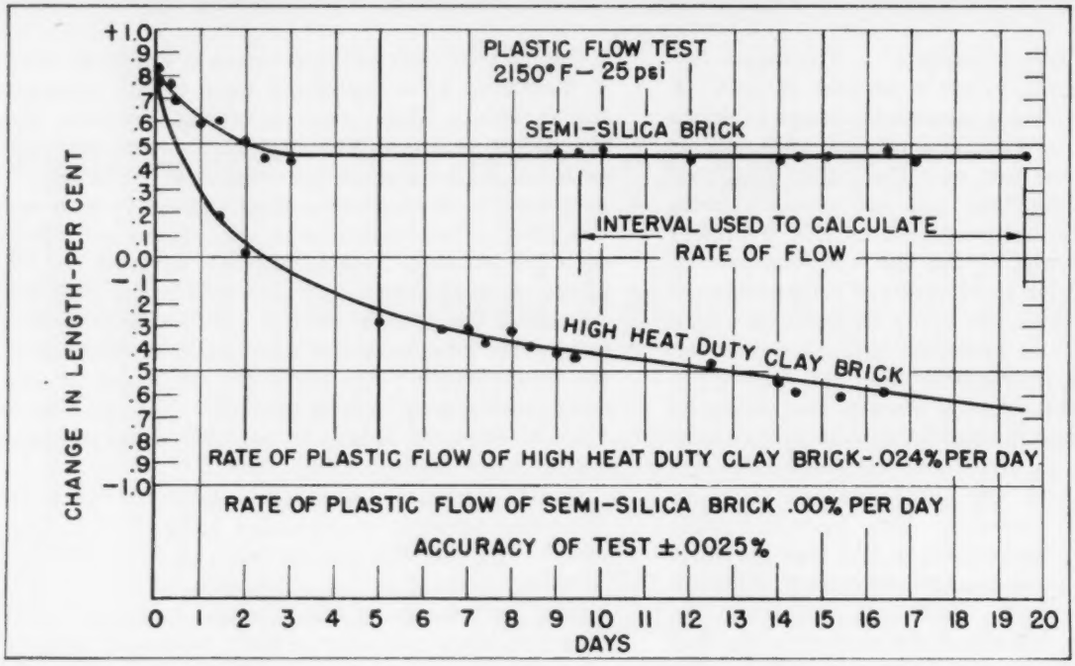


Fig. 3—Results of plastic flow test on semisilica and high heat duty clay brick

tion shows the coating to be too viscous to penetrate the pores of the brick. The index of refraction is so close to fused silica that its high viscosity would be expected. The high index and high iron content of the outer slag verifies that it is of a different composition than the protective coating.

The microscopic examination also showed mullite crystals in the protective coating. These crystals removed much of the alumina from the glassy phase making its composition still higher in silica than would be expected. Thin sections show that two distinct layers exist with an abrupt change at the contact plane. This is also noticed by the fact that the outer layer can be separated along this plane of contact by tapping.

The protective coating also has a much lower Fe_2O_3 content which can be noticed by its white color with the microscope. After this protective layer is formed, additional fluxes begin to accumulate on its surface which is impervious and of high viscosity. Consequently, the new deposits of fluxes react with only a small amount of this protective layer forming the outer layer of slag with lower viscosity. This more fluid slag runs over the surface of the protective layer. As the protective layer of glass is worn away on the hot side, it reforms. Thus, the bricks are slowly worn back by slag action which is confined to the hot surface and retarded by the protective coating.

Low Plastic Flow—Besides having an important advantage in structural spalling resistance, semisilica brick also have a distinct advantage over the clay brick group in that they do not deform or bend out of shape under stress at temperatures encountered in service. The standard load test data shown in Table I indicates they might be somewhat better than most high heat duty brick but the difference found in service is much greater.

To illustrate this point is presented a typical case about which reliable data are available. A large tunnel kiln firing sanitary ware was built in 1923 with semisilica brick. In 1928 another kiln of similar design was constructed with high heat duty clay brick and used to fire the same kind of ware. In 10 years the roof of the clay brick lined kiln had subsided so much it was necessary to rebuild the kiln. It was estimated the roof dropped about 10 inches during this time. After 27 years, the first kiln is still in operation with no noticeable subsidence.

Test Records Impressive—The construction details and temperature conditions of the arch in this kiln are shown in Fig. 2. The dotted line under the arch indicates the approximate position of the arch after 10 years service showing a 10-inch drop. In this case the average deformation of the brick arch would be 10 per cent to permit a 10-inch drop. When the records of these kilns are studied the following facts are revealed:

1. The back few inches of the inner course of brick must deform to permit the brick to subside.
2. The mean temperature of the coolest quarter of the wedge brick used in the arch is about 2150° F or less.
3. The time required for the arch to deform is so long that it is better described as "creep" or "plastic flow" rather than softening in the usual sense.
4. When semisilica brick are compared to clay brick or super duty brick in standard load tests run at 2460° F or higher, the results do not always indicate the most satisfactory brick for resisting deformation at high temperatures.
5. Plastic flow tests run at the temperature encountered in service will not only indicate the most suitable brick to resist deformation but will give a good indication of how long it will last. Such tests determine the amount of plastic flow per unit of time which, of course, can be calculated to the time required for any amount of deformation that can be tolerated in the particular furnace.

During the past year a special furnace has been built for running plastic flow tests. A semisilica brick and a high heat duty brick have been run under a stress of 25 psi at 2150° F for 485 hours. Results of the tests are shown in Fig. 3.

Load Test Results—In the standard load test run at 2642° F the same two bricks tested as follows: The semisilica brick deformed 2.32 per cent and the high heat duty clay brick deformed 5.59 per cent. This particular high heat duty clay brick was selected because it is one of the best brands with respect to the standard load test. The test was run at 2150° F because the mean temperature of the outer quarter of the arch in the tunnel kiln was calculated to

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be 2138° F. The calculations were based on temperatures that were not considered accurate closer than 10 to 15 degrees; therefore the figure of 2150° F was selected.

The rate of flow determined for the clay brick was 0.24 per cent in 10 days or 0.024 per cent per day at 25 psi. If we refer to Norton's chart[5] showing rate of flow plotted against load, we will see that decreasing the pressure from 25 to 5¼ psi as found in the kiln will divide the rate of flow by about one-seventh. This would change the rate of flow per day to 0.0034 per cent. This daily figure times 3650 (days in 10 years) comes to 12.4 per cent deformation in 10 years as compared to an estimated 10 per cent as found in the actual kiln.

The possible error in this plastic flow test is about 10 per cent which could account for half of this difference. The temperature of 2150° F (selected as representing a fair mean temperature of the part of the arch carrying the stress) is, no doubt, on the high side.* Making allowance for these two factors, the figures look encouraging. Actual temperature measurements of the cold face kiln arch should be recommended in the future. More exact methods for determining the rate of plastic flow have been suggested that should yield figures of engineering value.

Deformation—3% in 24 Years—Last summer in the same plant another kiln of semisilica brick, built in 1926, was down for minor repairs. At this time the heat zone was inspected and showed that the deformation, if any existed, was within the range of the results of the plastic flow test. Within the limits of this test the semisilica brick did not show any plastic flow after a small initial subsidence. However the error of the test would still make possible a total deformation of approximately 1¼ per cent in 10 years or 3 per cent in 24 years. The ability of semisilica brick to resist plastic flow is not affected by slag absorption as are clay brick.

In spite of the low fusion point of semisilica brick, their stability at high temperatures can be explained as follows: They are composed of two very refractory ingredients—silica with a P. C. E. of cone 33 and known to be capable of standing the severe conditions of the open-hearth furnace—and a kaolin type clay having a P. C. E. of cone 32-33, if this clay portion is tested after being separated from the silica portion. Of course, in P. C.E. tests these two refractory components begin to react at the eutectic point (2820° F) to form glass.

Under standard P.C.E. test procedure enough glass forms to bend the test cone by the time 2920-2950° F is reached. However when these brick are used as recommended, the temperature is below the eutectic point by at least 100 degrees or more and these two refractory components do not react to form the low melting glass seen at the end of a P.C.E. test. Under conditions of service, the silica retains its refractory properties of high strength at high temperatures and tends to very slowly expand, while the clay portion which gives the brick its resistance to thermal spalling tends to take up much of this expansion.

Structure of the semisilica brick is peculiar to this class of refractory. It is effective in retarding the reaction between the clay and silica portions up to temperatures quite close to the eutectic point.

Expansion Must Be Considered—The maximum permanent expansion of semisilica brick is about three-quarters as much as silica brick. This might be a little higher than expected, but it is accounted for by the fact that the silica portion contains a higher percentage of quartz. In practically every case expansion is less than this because the clay portion of the brick is subject to plastic flow and some shrinkage in the temperature range where silica expands. This tends to offset some of the permanent expansion and in some cases, all of it.

Results of the plastic flow test previously shown indicates that at a pressure of 25 psi, the brick does not exhibit any expansion. In several cases it has been noted in practice that the permanent expansion is nil where the brick are under stress or retained by strong buckstays. In other cases where extra large expansion joints are used, the brick will most likely expand enough to close up joints provided for 2 per cent expansion. It is good engineering practice however to provide for 1 to 1½ per cent expansion. The reversible expansion compared with clay brick and silica brick is shown in Fig. 4.

Effect Of Slags—Up until now, semisilica brick have not been offered in highly slag resistant grades. Porosity of semisilica brick runs from an approximate minimum of 24 to a maximum of 28 per cent. This high porosity is an advantage in giving the brick the ability to absorb thermal shocks and the expansion of the silica they contain. However, the protective coating that forms over the surface of semisilica

TABLE I
RESULTS OF ASTM STANDARD LOAD TESTS ON HIGH HEAT DUTY AND SEMISILICA BRICK

	High Heat Duty	Semisilica
Fusion test P.C.E.	32 (3100° F)	28 (2950° F)
Reheat 2900° F	0.2%	slumps
Load test at 2642° F	4–6%*	less than 4%
Loss in panel spall test	5–14%	4–15%
Porosity	16%	28%
Al_2O_3 content	37%	20%

* This range is for the most load resistant brands

* This method of using the mean temperature of the cooler quarter of the inner lining should be tested by further service investigations and revised if necessary.

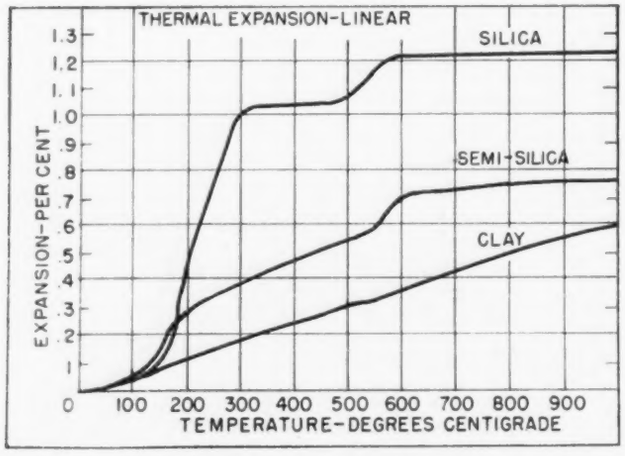

Fig. 4—Reversible thermal expansion curves for silica, semisilica, and clay brick test specimens

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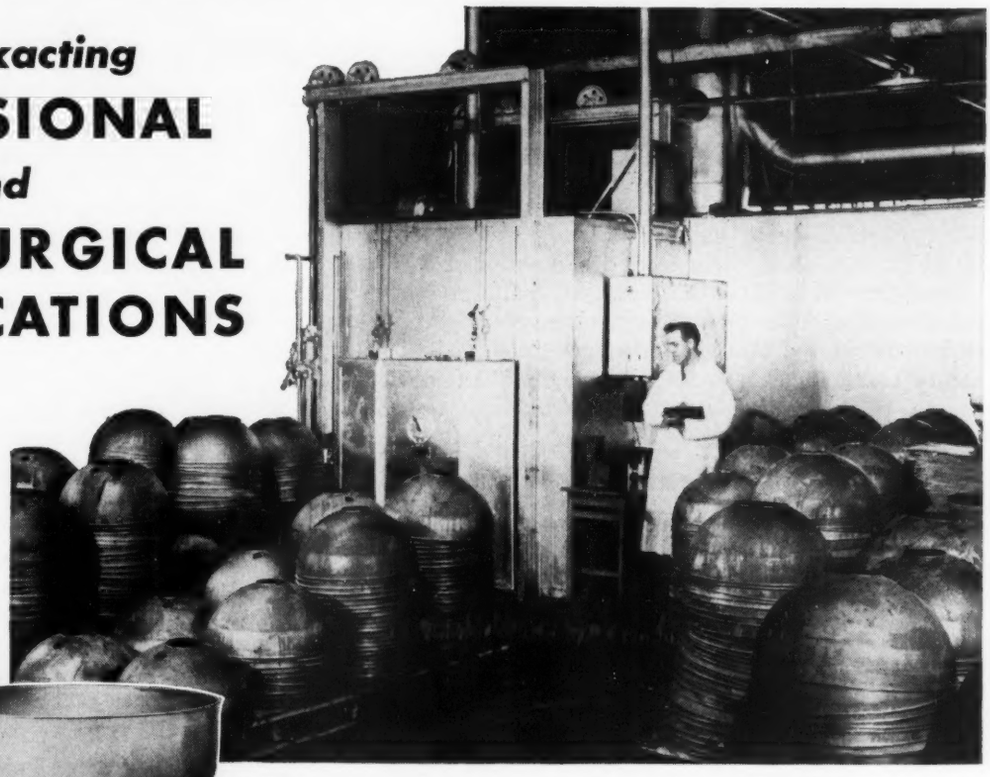

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TABLE II
SEMISILICA BRICK COMPARED TO CLAY AND SILICA BRICK

	Plastic Flow Resistance	Thermal Spalling	Structural Spalling	Reverable Expansion	Permanent Expansion
High Heat Duty Clay Brick	Lowest	Best	Low	Lowest	Lowest
Semisilica Brick	OK up to hot face temperature of 2800° F	Lower than clay. OK for large furnaces	Best	More than clay—less than silica	Midway between silica and clay
Silica Brick	OK to over 3000° F	Lowest	Makes some trouble	Highest	Highest

brick enables them to stand up well in many applications where slagging conditions are not extremely severe. For instance, slags encountered in applications where the brick are recommended, usually wear them away so slowly that long life is obtained.

Semisilica Brick Uses—The over-all limits of semisilica brick require that their hot face temperature should not exceed 2750° F for long periods. Their inability to stand extreme thermal shocks limits their use in small furnaces that are heated and cooled daily. Larger furnaces that run for several days at a time due to their great mass, will not cool or heat suddenly enough to develop thermal spalling troubles with this brick.

They are normally used to overcome difficulties arising from structural spalling or deformation of furnace walls and roofs. Typical applications where semisilica brick have given excellent service are for kilns, soaking pits, forging furnaces, heating furnaces of all types, hot metal mixers, checker linings and fan tails of open hearths, and blast furnace stoves.

Semisilica brick have overcome the trouble encountered in some high walls from bending inward. This has been the case in big reheating furnaces and some of the larger stoker-fired boilers. In the latter it was found economical to use silica carbide refractories along the clinker line and semisilica brick for the rest.

There are two grades of semisilica brick offered on today's market. The one most commonly used contains 76 to 78 per cent SiO_2. This is the grade that was used in the previously described plastic flow test. However in certain boiler furnaces, it was found that a brick was needed having a higher resistance to thermal shock and a little higher strength. This has led to the use of another grade containing about 4 per cent less silica. This grade compared to the regular grade has the same high resistance to structural spalling, better resistance to thermal spalling, and a lower resistance to plastic flow and usually used in boiler furnaces.

REFERENCES

1—ASTM Designation C 71-47

2—The same lot of semisilica brick were tested in a standard panel spalling test with preheat at 2910° F and without preheat, with the following results: 10.4 per cent loss with preheat—11.8 per cent without preheat

3—V. H. Chesters, *Steelplant Refractories*, page 63

4—G. B. Remmey, "Some Properties of Semisilica Brick", *Journal of the American Ceramic Society*, Vol. 22, No. 6, June 1939.

5—F. H. Norton, "A Critical Examination of the Load Test for Refractories", *Journal of the American Ceramic Society*, Vol. 22, No. 10, 1939

With the Greatest of Ease

Romeo could have found Juliet with ease, had he been able to benefit by the system of overhead traveling cranes used by Reserve Terminals Co., Cleveland, for speeding up transfer between floors. With its warehouse having a unique arrangement of balconies used for storage purposes, the company is making use of a demounted truck bed suspended from a crane hook. This portable platform carries full truck loads of material to any point in the warehouse with a minimum of handling and cartage. A system of shuttling with two platforms, using pallets, fork-lift trucks and other warehouse handling equipment is said to be forming an efficient relay team. An all-steel version of the "air lift" platform will soon carry heavy machinery and other equipment weighing up to 10 tons.

Basic Arc Electric Furnace

Recently made available is a booklet, Theoretical Chemical Reactions in Basic Arc Electric Furnace, written by H. C. Bigge, of Bethlehem Steel Co. Sections of the book are entitled: Oxidizing and reducing reactions in the basic arc furnace, this section including various types of reduction; sulphur elimination during the reducing period; desulphurization in basic arc furnace; and reduction table for some of the important oxides encountered in the iron and steel industry.

Booklet may be obtained by writing to Mr. Bigge, superintendent, tool steel department, Bethlehem Steel Co., Bethlehem, Pa.

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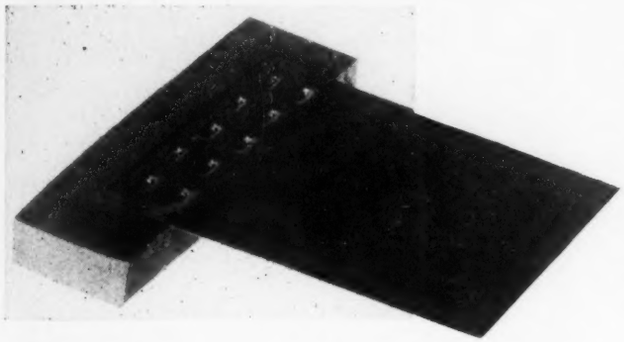
New Applications Broaden Heatless Welding Uses

SEVERAL new applications, broadening the field of uses, have resulted from the introduction of the Koldweld method of cold pressure welding without the use of heat or electricity (STEEL Nov. 7, 1949, p. 109; and Nov. 21, 1949, p. 117). A development of General Electric Co. Ltd., of England, the process is applicable to all nonferrous metals. It makes use of welding pressure applied manually or by power tools.

The trap weld was developed as a method of fastening screw studs to the sides of kitchen utensils for the attachment of knobs and handles. After welding, the screw stud or threaded insert is in effect integral with the utensil. The fabricated metal form has a metal insert firmly imbedded into another metal structure by a process using two metal parts. According to Koldweld Corp. of New York, U. S. licensee, different types of metal inserts or parts can

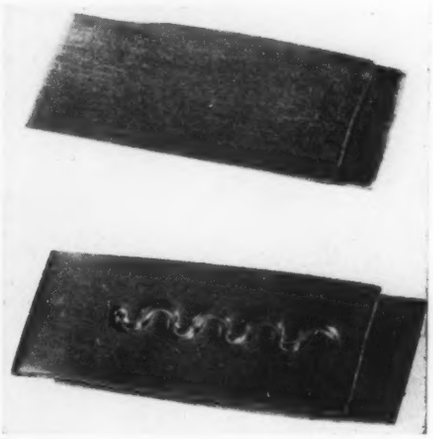


Stagger weld for joining thin metal sheets to heavy bar stock. It consists of staggered dots or straight-line welds on two or more parallel lines

be molded between dissimilar nonferrous metals. This weld also produces female counterpart of screw stud.

No Buckling Here—Where the standard straight-line weld was found undesirable, the wave weld was developed, it being applied as easily as the regular straight-line weld, the company reports. Because the wave line intersects the grain of the metal, this type of weld is said to be somewhat stronger. The finished work has no tendency to bend or buckle along the weld line when this method is used. The tool has a shaped element pressing against a flat plate.

Often found difficult and sometimes impossible is the welding of comparatively thin metal sheets to heavy bar stock, such as encountered in the construction of truck bodies, railroad cars, shelving, etc. This led to the development of the stagger weld in which a number of dots or short straight-line welds are slightly staggered so that they lie along two or more parallel lines. They are formed with a special tool applying to the thin sheet side of the work. Tool



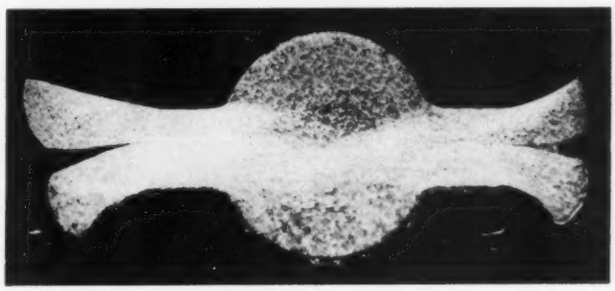
Both sides of a wave-welded joint. Because it intersects the grain of the metal, this weld is somewhat stronger than the straight line weld

presses a shaped element pressed against the plate.

Welding Sandwich Served Up—To offset objections made by fabricators to the indentations on the surface of the work produced by the application of the pressure welding tool, a new type of weld was developed in which the indentations appear on one side. The other side remains smooth. Koldweld tests show this weld to be much stronger than the weld with indentations on both sides. Next, a method where third piece of metal was used to fill up the indentation was developed. The three pieces are welded together in a single operation, the result being the elimination of tool indentations on both sides.

Problems submitted by a government department required the manufacture of large thin walled sheet metal boxes or containers which had to be air-tight and moisture-proof, besides being made of single sheets. By redesigning the container blank slightly, the sides of the container were allowed to overlap so that the lap welding could be performed. Result was a weld that had a strength of 130 per cent of the original material.

Other Applications Developed — Silver electrical contacts, riveted, silver-soldered or brazed to copper or brass bars, are being welded by the processes for switches, circuit breakers, relays and similar equipment. It is also reported feasible for welding heterogenous nonferrous metals, including commercial copper, pure electrolytic copper, beryllium copper, brass, silver, aluminum, lead, nickel, and their alloys, including Monel.



Photomicrograph of aluminum and copper wire joined by the Koldweld process, showing how facing halves fuse and flow out into welded flaps on each side

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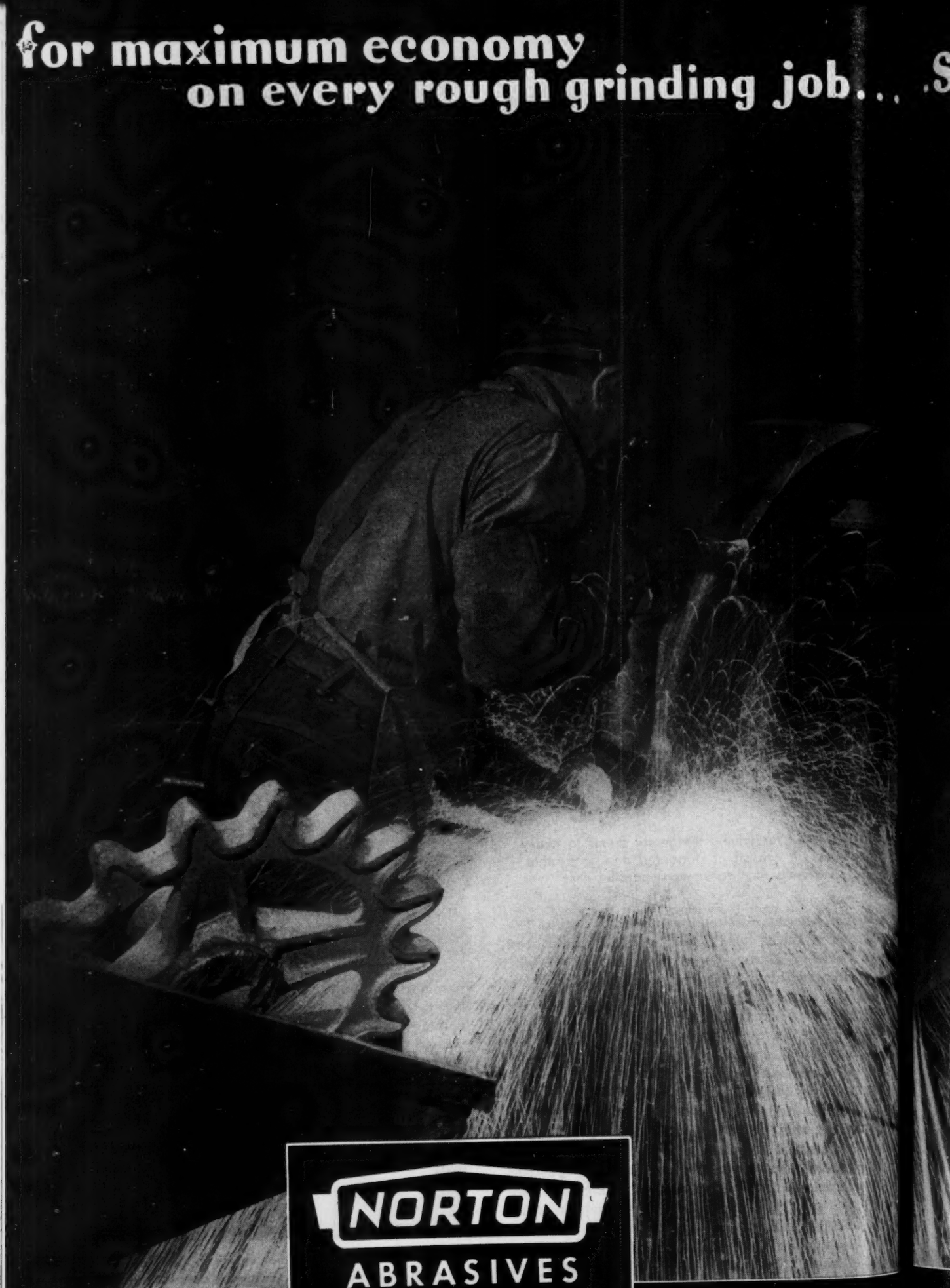

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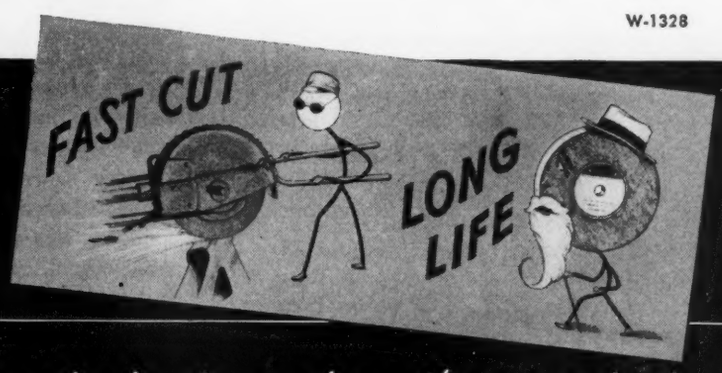

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How To Prevent Blast Furnace Lining Disintegration

Treating brickwork with sulphur and chloride compounds by soaking, dipping, spraying or adding the chemical to the bonding material affords adequate protection against carbon monoxide disintegration of refractories

By J. A. SHEA
General Supervisor of Research
Carnegie-Illinois Steel Corp.
Gary, Ind.

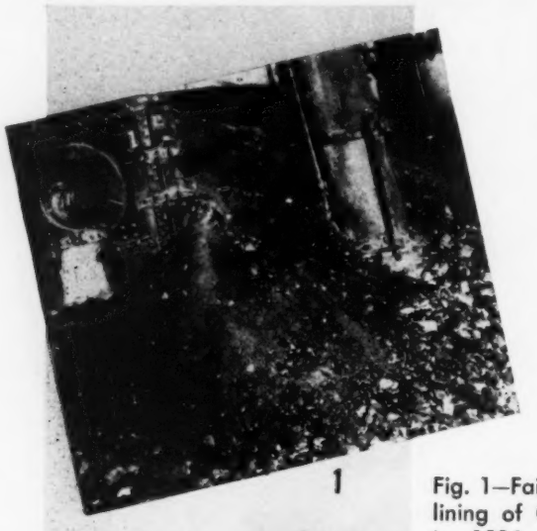
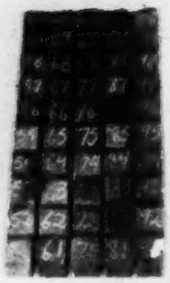


Fig. 1—Failure of inwall lining of Gary furnace in 1926 showing the pulverized condition of the refractory

Fig. 2—Untreated high-duty brick specimens after testing. Fig. 3—Sulphuric acid treated high-duty brick after 40-hour test



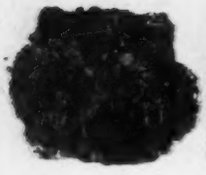
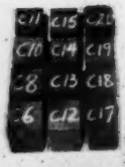


Fig. 4 — Disintegration susceptible specimens after testing. Fig. 5—Ammonium sulphate treated disintegration susceptible after testing

Fig. 6 — Disintegration susceptible specimen. Ammonium sulphate solution poured on samples before testing. Fig. 7—Aluminum sulphate treated samples before testing. Fig. 8—Disintegration susceptible specimens treated with hydrogen sulphide gas before testing



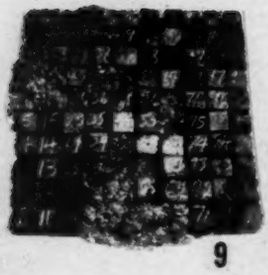


Fig. 9—High-duty brick specimens after a 40-hour disintegration test

CARBON disintegration of the fireclay bricks in a blast furnace lining is caused by carbon monoxide of the blast furnace gases entering the bricks and depositing carbon around iron oxide particles in the bricks. The iron oxide particles act as a catalyst. The growing carbon deposits crack or disintegrate the brick. The catalytic reaction proceeds rapidly in the temperature range of 800 to 1100° F and the greatest damage to a blast furnace lining occurs in the portions of the linings where these temperatures are encountered.

Prior to 1930, linings were often extensively damaged by such carbon deposition in the bricks. In some cases pressures developed by carbon deposition would split the furnace shells and in many cases the linings would fail at low tonnages. Fig. 1 shows the condition of the brickwork taken from a Gary furnace in 1926. Much of the inwall lining of this furnace was in a pulverized condition, which caused the lining to fall into the hearth after the stock was removed. Several carloads of the pulverized brick were removed from the furnace.

What the Tests Showed—Early attempts to remove the iron in bricks by treating them with hydrogen chloride gas at elevated temperature were only partly successful. Such a procedure would probably work, but might not be practical. Initial treatment, which was successful and which led to the development of a number of other practical treatments, consisted of dipping a sample of a disintegration-susceptible brick in a 10 per cent solution of sulphuric acid. After drying and heating to 1000° F to drive off excess acid, this treated sample was tested for disintegration for 40 hours without being affected. After this initial test, the sulphuric acid treatment was tried on a larger scale.

Fifty representative high-duty bricks were cut to provide two duplicate sets of 50 samples. One set of samples was soaked in a 10 per cent solution of sulphuric acid, dried, and heated to 1000° F prior to being tested for disintegration, while the other set was tested in the untreated condition. Fig. 2 shows the

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condition of the 50 untreated specimens after a 40 hour disintegration test. Twenty-six of the specimens were disintegrated, 10 were badly cracked, and 11 were cracked to a lesser degree. Fig. 3 shows the condition of the acid treated specimens after a 40-hour disintegration test. The treated specimens were not affected by the test.

Similar results were obtained by treating specimens from selected disintegration-susceptible blast furnace bricks with ammonium sulphate, aluminum sulphate, or hydrogen sulphide. Fig. 4 shows the condition of 12 untreated specimens from disintegration-susceptible brick after a 40-hour disintegration test. All of the specimens were affected by the test. Duplicates of these specimens, soaked in 30 per cent ammonium sulphate and tested for disintegration, are shown in Fig. 5. The ammonium sulphate treatment was completely effective in preventing disintegration. Adequate protection against disintegration can be obtained without soaking the bricks in the treating solution. The disintegration-susceptible specimens shown in Fig. 6 were treated by pouring 45 per cent ammonium sulphate solution over the top surfaces before they were tested for disintegration. This procedure was effective in preventing disintegration.

Other Effective Treatments — Effectiveness of a treatment with aluminum sulphate solution is shown in Fig. 7. These disintegration-susceptible specimens were soaked in 30 per cent aluminum sulphate solution before being tested. Specimens were not affected by the 40-hour test.

Treating the bricks with hydrogen sulphide gas at elevated temperatures was found an effective method of preventing disintegration. Fig. 8 shows condition of hydrogen sulphide treated specimens of disintegration-susceptible brick after a 40-hour disintegration test. Specimens were heated to 950° F and exposed to hydrogen sulphide gas for 30 minutes before being tested. There was no damage to any of the specimens.

A number of other sulphur and chloride compounds were found to be effective in preventing disintegration of blast furnace bricks, such as:

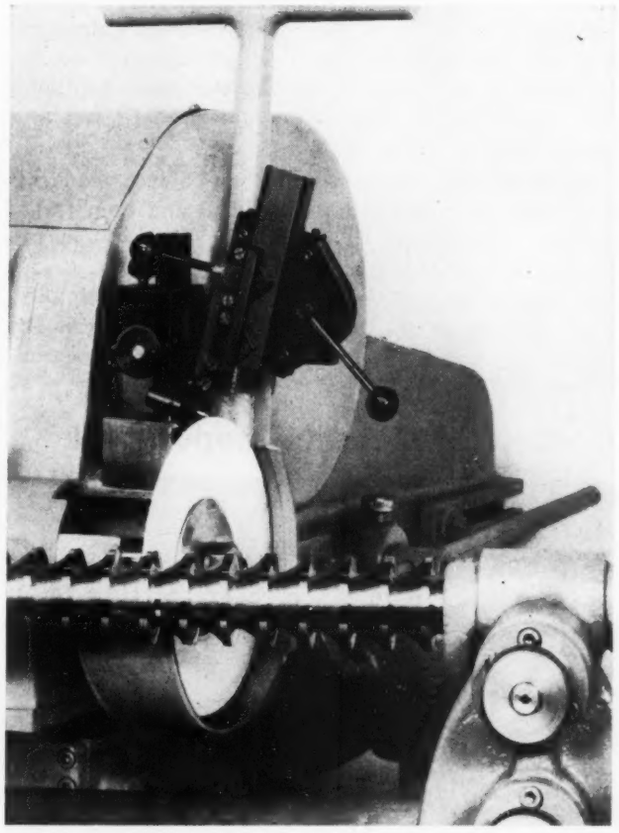
- CS_2 gas
- 20% cobalt sulphate
- Saturated manganese sulphate
- Ethyl sulphate
- 30% ammonium persulphate
- 20% sodium thiosulphate
- 30% ammonium sulphite
- 20% sodium bisulphite
- 30% ammonium thiocyanate
- 30% magnesium chloride
- 30% calcium chlroide
- 20% nickel chloride
- 30% manganese chloride
- 30% zinc chloride
- 30% lithium chloride
- 30% cobalt chloride
- Saturated potassium chloride

Many other chemicals were found to be more or less effective.

Treated on Production Basis—The normal burned high-duty inwall bricks used in relining a Gary blast furnace were treated with a 30 per cent ammonium sulphate solution. This was accomplished by passing the bricks through a stream of the solution as they moved down a roller conveyer to the floor of the furnace. Samples of the bricks used in this lining were tested for disintegration, some in the untreated condition and some after the ammonium sulphate treatment at the furnace. Fig. 9 shows the condition of 100 samples of the untreated brick after a 40-hour disintegration test. Twenty-five of the samples were classed as disintegrated, 57 as badly cracked, 17 as cracked, and one as spalled. The results of this test showed the bricks to be susceptible to damage by carbon deposition. Only one of 45 ammonium sulphate treated specimens after a 40-hour disintegration test was affected by the test. Judging from these results, the treatment appeared to be effective.

Good for 12 Months—The treated inwall lining of this furnace was core drilled after being on blast for 11 months. No indications of disintegration were found in the lining and the core samples passed a 40-hour disintegration test without being affected. From these results, it appears that the treatment is effec-

That's Fine!



Finer wheel finish produced by this Dymon-ize grinding wheel dressing attachment for use on broach sharpeners increases smoothness materially, not only on broaches, but on machine surfaces produced by the broaches. A development of Colonial Broach Co., Detroit, the unit shown here consists of an adjustable mechanism that can be used to produce a fine finish on both the radius and sides of a broach grinding wheel. The smoother surface is said to be traceable to reduction in height of minute "tool marks" at the cutting edges of the broach teeth. Smoother chip flow in curling up in the chip space is reported. Any radius ranging up to 5/16-inch can be dressed by a single adjustment. Unit has two control handles.

tive for a year or more. The treated lining is to be examined and tested for disintegration on completion of its campaign.

As an added word of caution, it should be pointed out that zones of localized wear, sometimes referred to as hot spots, can develop in either treated or untreated linings. Although the treating of bricks apparently prevents carbon monoxide disintegration, it should not be regarded as a "cure-all" for all lining troubles.

Treatment with the chemical solutions can be accomplished by soaking, dipping, spraying, or by adding the chemical to the bonding material used in laying the bricks. To determine the effectiveness of adding chemicals to a sillimanite bond, a brick column was built up with specimens of disintegration—susceptible brick using a sillimanite mortar as a bond. The column was then tested for disintegration in a circular chamber. No chemical was added to the sillimanite bond, and after a 40-hour test all of the specimens were disintegrated or cracked and the column was disrupted. A column then was built up of duplicate specimens, but bonded with a sillimanite slurry made up with 45 per cent ammonium sulphate solution instead of water. The 40-hour disintegration test caused only a few superficial spalls on exposed faces of the brick specimens. Similar column tests were made using aluminum sulphate and sulphuric acid in the bond.

Atmospheres Vs Treatments—A column made up with aluminum sulphate in the bond and then tested disclosed superficial surface spalls on two of the specimens, but there was no cracking or disintegration of the specimens. Use of 5 per cent sulphuric acid solution in the bond instead of water did not completely stop carbon deposition. Some of the specimens cracked but a stronger acid solution probably would have prevented this cracking.

With chemicals such as H_2S, CS_2, and perhaps some of the other sulphur compounds, blast furnace bricks could be effectively treated in the periodic kilns during the cooling period after the bricks had been fired. With these chemicals, the bricks should be at a temperature in the range 700 to 1500° F when treated.

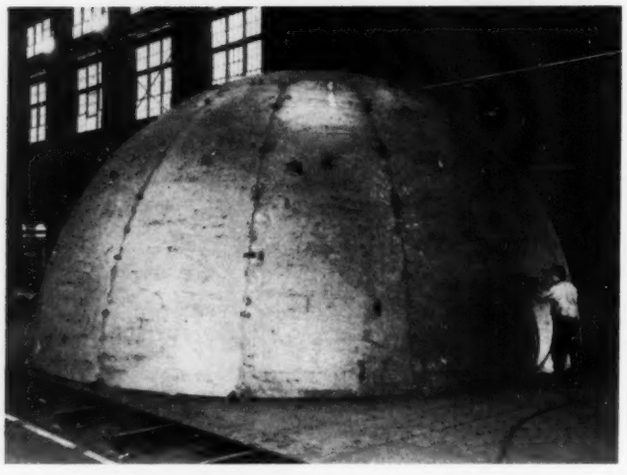
Temperatures above 1000 to 1300° F in an oxidizing atmosphere will destroy any of these treatments. In a carbon monoxide atmosphere, much higher temperatures are required to destroy the effect of the treatments.

The condition of 30 specimens of hard burned high-duty bricks after a 40-hour disintegration test were not affected by the test. Most of the hard burned bricks now on the market are highly resistant to disintegration. If only added resistance to disintegration is required, this can be obtained at less cost by treating regular fired bricks than by buying the higher priced, hard burned bricks. However, in most cases the hard burned bricks have the additional advantages of greater strength and density.

Applications for patents to cover the various chemical treatments have been made.

From paper presented at the joint meeting of the Blast Furnace and Coke Associations of the Eastern States and the Chicago District, Del Prado Hotel, Chicago, Nov. 3.

Cap for Capsule-Shaped Tank



In all likelihood no one in Argentina will think that this steel tank resembles the home of an Eskimo. Being constructed for this South American government at the Steelton plant of Bethlehem Steel Co., this igloo-shaped spherical head is being temporarily check-assembled in the fabricating shop. Construction is of steel plate 0.41-inch thick. Of 34-foot diameter it will be part of a capsule-shaped gas holder 205 feet long. The order calls for ten holders, each of which has a capacity of 500,000 cu ft

Redesign Saves Copper, Zinc

To save the large quantities of copper and zinc that have gone into rotating bands for ammunition in past wars, the Army Ordnance Corps is pushing its investigation of iron powder as a replacement for gilding metal. Limited experience, say spokesmen, offers encouragement. In fact, iron powder bands now are specified for one type of ammunition for which gilding metal bands are not entirely satisfactory. This is the 90-mm high-velocity projectile.

Another new project calls for determination of the merits of iron powder bands for the popular 105-mm projectile. If results are as hoped, the investigation will be extended to other sizes and types. Tied in with this investigation is a study of the possibilities with all types of iron powder, both low and high-priced varieties.

Limited tests of iron powder rotating bands for 20-mm armor-piercing ammunition have indicated, first, that the bands perform satisfactorily and, second, that a low-density compact is necessary. These tests also revealed that the band seat must be undercut for maximum performance.

Should the campaign now under way result in approval of iron powder bands for a wide range of ammunition a big expansion in the iron powder industry would be necessary in the event of a major war. Present capacity, Ordnance spokesmen say, would be utterly inadequate. In the meantime, they hope, efforts should be made to develop new low-cost iron powder manufacturing processes.

Working with the Army Ordnance Corps on the problem, including the writing of a new improved specification, is a new subcommittee of the American Ordnance Association's shell committee. The sub-

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Doehler-Jarvis First ...AS USUAL

One-Piece Die Cast Garnish Mouldings for the 1951 Kaiser

Cast Moulding Gives Best Fit

A notable styling improvement on the 1951 Kaiser is the relative absence of exposed mounting screws on the window garnish moldings.

This is mainly attributable to the fact that the new moldings are manufactured from a one-piece die-cast rather than a stamping.

The greater rigidity of the aluminum die-cast part, supplied to K-F by Doehler-Jarvis, makes fewer mounting screws necessary.

Only two screws—one at each end—are necessary in the long base of the molding, while the stamping required screws along the full perimeter.

Rigidity of the new molding makes it possible to place the top mounting screws through the exposed upper edge of the door. The front garnish molding is mounted with four screws, the rear with five.

Other advantages of the die-cast are these:

1—The one-piece part provides a better fit. There no fitting problems resulting from variances in welds or metal finishing as encountered in the welded stamping.

2—As compared with stamping, die-casting of the new molding, due to its design, results in a slightly lower per part cost.

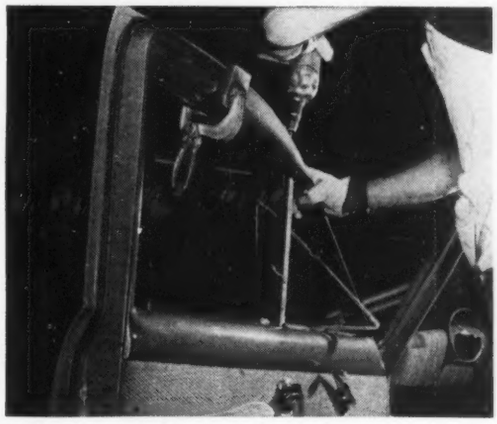
3—The better fit of the die-cast part and the reduction in the number of mounting screws has reduced installation time, with a resultant saving in assembly cost.

4—The better fit and the fact that there are fewer screws to be mounted reduces the possibility of damage to the molding during installation.

Reprinted from Kaiser-Frazer News

Die casting may be the answer to your problem, just as it was for the Kaiser-Frazer Corporation in the production of garnish window mouldings for the 1951 Kaiser. The same Doehler-Jarvis research, engineering, and mass-production facilities which made this development possible are available to you.

DIE CASTING IS SO RIGID that only two screws are needed on the long base.



STYLING IMPROVEMENT—rigidity also permits placement of top screws through unexposed edge.

ONE-PIECE DIE CASTING gives better fit—reduces assembly time.

DOEHLER-JARVIS CORPORATION

The World's Largest Producer and Finisher of Die Castings

PLANTS AT: TOLEDO, OHIO • POTTSTOWN, PA. • BATAVIA, N. Y. • GRAND RAPIDS, MICH. • CHICAGO, ILL.

EXECUTIVE OFFICES: 386 FOURTH AVENUE, NEW YORK 16, N. Y.

committee, composed of iron powder producers and compacters, is headed by A. J. Langhammer, president, Amplex Division, Chrysler Corp., Detroit.

Lubricant Made of Metal

Because the introduction of a molybdenum-base lubricant several months ago has opened up new possibilities in machine design by providing safe lubrication at higher speeds, pressures and temperatures, Lockrey Co., College Point, N. Y., has found it necessary to develop several new forms to meet especially severe conditions. These are described in their technical bulletin No. 21 E and are known as Liqui-Moly NV regular and grease, Liqui-Moly NV thread compound and Moly-Wax-Stix.

Liqui-Moly is a compound of extremely greasy metal molybdenum said to have the peculiar property of attaching itself by molecular attraction to metal bearing-surfaces, forming a lubricating film which cannot be squeezed out by any amount of pressure. It can withstand extremes of temperature without affecting its lubricating qualities.

The company incorporates this material in a volatile liquid which serves to transport the metallic lubricant to the bearing surfaces where the vehicle evaporates and allows the molybdenum to "plate out" on the bearing surfaces, the result being a dry but perfectly lubricated bearing.

Pours at 25 Below—Having a high viscosity index is Liqui-Moly NV regular and grease, both incorporated in a liquid glycol derivative that will pour as low as −25° F. The thread compound is said to take advantage of the ability of molybdenum to prevent metals from seizing or freezing together under extreme pressure, to provide a thread compound that makes it possible to disassemble any piping or equipment after a period of operation at high temperature or under severe corrosive conditions without damage to the equipment.

Convenient means of applying this molybdenum-base lubricant in solid form are provided by the Moly-Wax-Stix. Uses are for filling grooves cut in bushings or thrust washers, to feed out molybdenum slowly, to lubricate glass pet-cocks and chemical glassware, to rub sliding ways and to cast solid lubricant shapes.

Tractors "Cultivate" Stud Welding

Applications of stud welding to the production of garden tractors has enabled the Midland Co., South Milwaukee, Wis., to reduce production costs and assembly problems by making possible simpler product design and fabrication. Company reports that many manhours have been saved in design and redesign time and assembly operations speeded up. The stud welding, a development of Nelson Stud Welding Division, Morton-Gregory Corp., Lorain, O., is used in manufacturing connecting rod yokes used on sickle bar mowers, the cost of this part being reduced by one-half. All stud welding operations at the plant are performed with a specially designed unit, fixture being used to locate the workpieces in proper relation to the stud welding gun

The Whole Area Glows

Method of producing light by the direct transformation of electric energy, called electrolumenescence, gives promise of being as revolutionary in the lighting field as was Edison's first incandescent lamp. The new development was disclosed by Dr. E. F. Lowry, manager of general lighting laboratories, Sylvania Electric Products Inc., at a recent Illuminating Engineering Society national convention in Pasadena, Calif.

Electrolumenescence employs an area source of light in contrast to the point source as in the incandescent lamp, or the linear source as in the fluorescent lamp. No intermediate phenomenon, such as incandescent glow or arc discharge is said to take place.

Would Make A Glow Worm Jealous—According to Sylvania engineers the new device is, in effect, a luminous capacitor made up of two conducting plates, one of which is electric conducting glass. Between the plates is a layer of material which glows when energized. The brightness of the light increases with frequency and also with an increasing voltage over a considerable range until breakdown occurs.

Since electrolumenescent devices do not depend on hermetically sealed glass bulbs or tubes and since the luminous panels reportedly may be of any convenient size or shape, whole areas such as the entire ceiling of a room can be made to become the source of a high intensity but glare-free and shadowless light.

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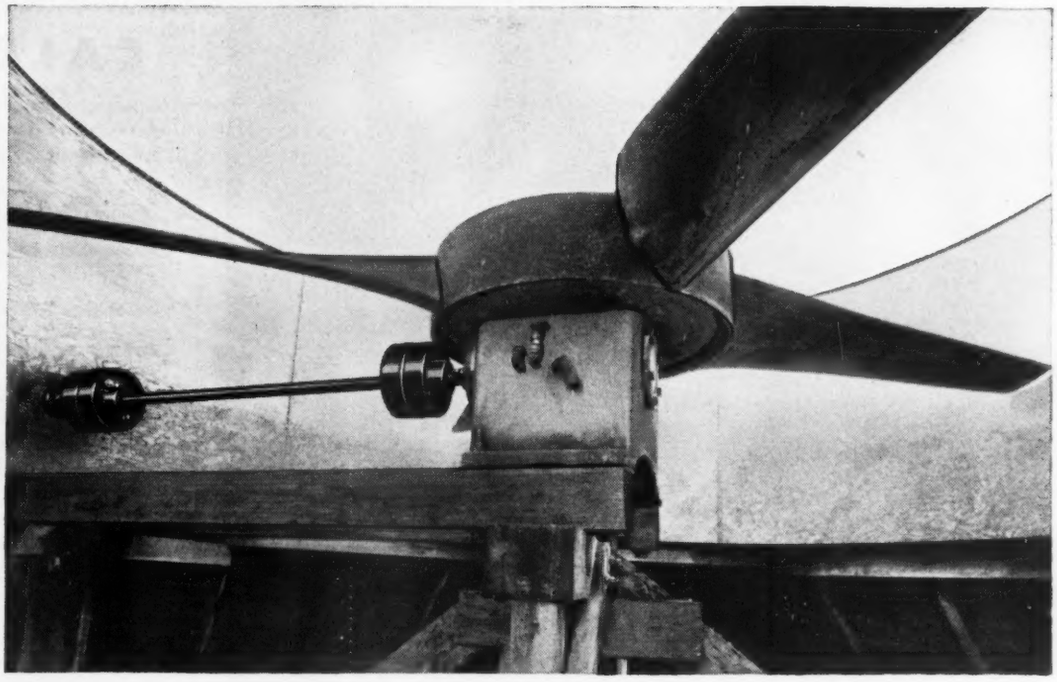


Thirty horsepower at 1800 r.p.m. is transmitted through two Morse Morflex Couplings on drive shaft to right angle vertical reducer and then to fan which spins at 500 r.p.m.

Morse Morflex Couplings

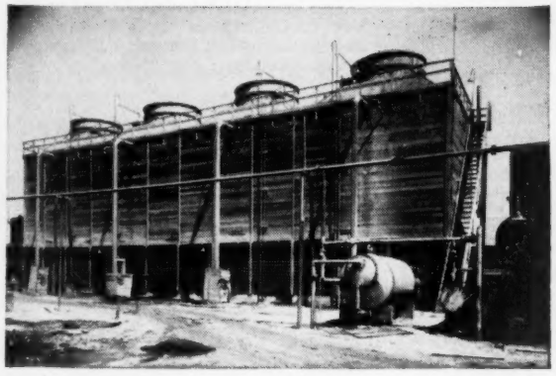
like to be ignored

In the cooling towers of the Champlin Refining Company, giant twelve-foot fans whirl away hot vapors twenty-four hours a day, month in and month out. Two Morse Morflex Couplings are used on the drive shaft of the fan in each tower. And though the first Morse Couplings installed have been in service for over four years, they have needed no attention whatsoever.

MORSE COUPLINGS CAN "TAKE IT"

Morse Couplings are made to take the beating given by continuous operation, hot vapors, and complete absence of lubrication. Impervious to dirt, water, oil, and weather, Morse Morflex Couplings are torsionally flexible. They require no lubrication, no maintenance. Morse Morflex Couplings compensate for misalignment through elastic deflection of tough, muscle-like rubber biscuits.

Whether you require clutches or couplings, roller or silent chain, your power transmission problems end when you apply the formula M = PT.



Cooling towers of Champlin Refining Company. Giant fans dissipate heat and moisture twenty-four hours a day.

M=PT BASIC FORMULA

Morse *means* Power Transmission

MORSE
MECHANICAL
POWER TRANSMISSION
PRODUCTS

PRODUCTS OF B-W BORG-WARNER

For the complete Morflex Coupling story, write today. Ask for Catalog C45-49.

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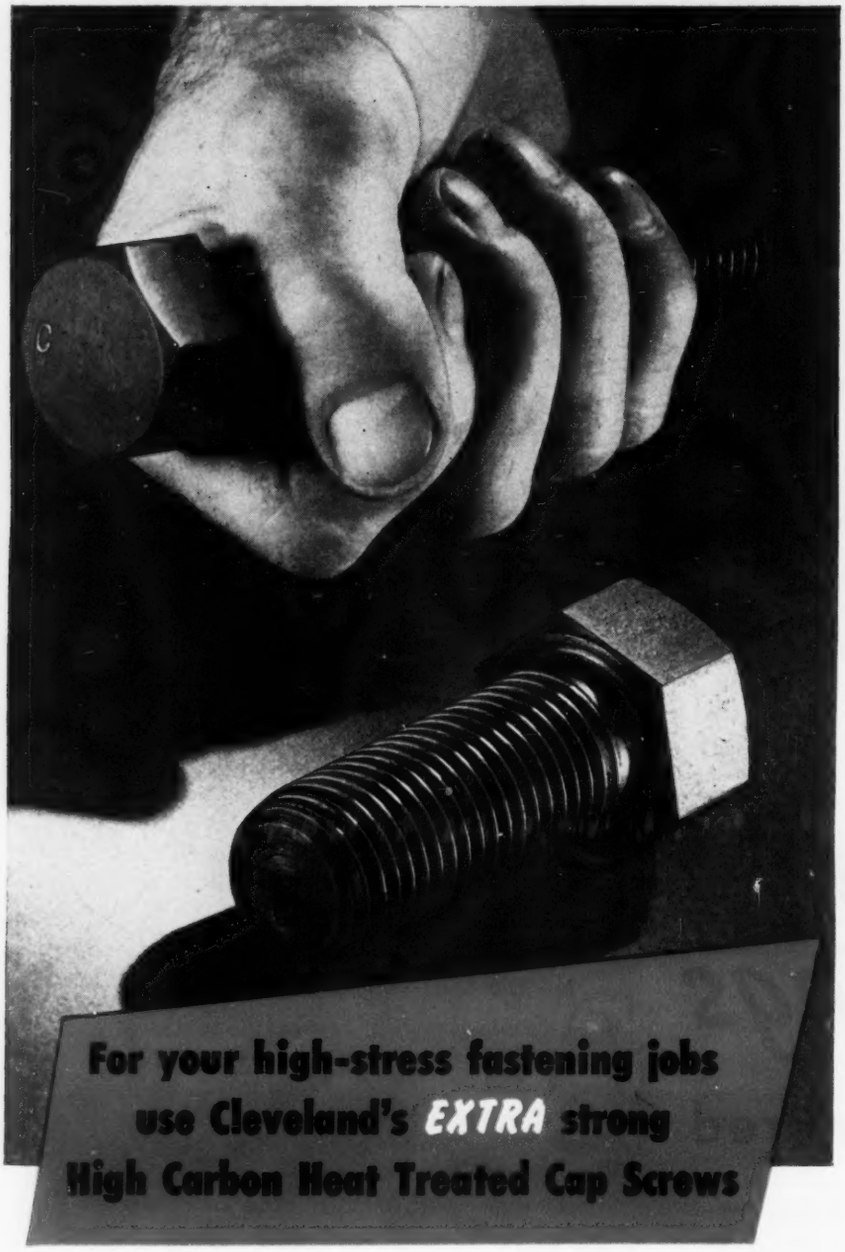

• Popular fasteners of great strength and uniform accuracy, Cleveland's High Carbon Cap Screws are made by the Kaufman Process. This famous *Double Extrusion* method assures more uniform dimensions within the tolerance range in the finished product and creates beneficial changes in the steel's grain flow. Complete range of sizes, diameters from ¼" upward. Write for our brochure explaining the Kaufman Process.

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Warehouses: Chicago, Philadelphia, New York, Providence

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ORIGINATORS OF THE KAUFMAN DOUBLE EXTRUSION PROCESS
Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners

CALENDAR OF MEETINGS

† *Denotes first listing in this column.*

Nov. 27-29, American Standards Association, National standardization conference, Waldorf-Astoria Hotel, New York. Association may be reached at 70 E. 45th St., New York 17.

Nov. 27-Dec. 2, American Society of Mechanical Engineers: 19th National Exposition of Power and Mechanical Engineering and annual meeting, Grand Central Palace, New York. Exposition headquarters: Grand Central Palace, New York 17.

Dec. 1, American Iron & Steel Institute, regional technical meeting, Drake Hotel, Chicago. AISI headquarters: 350 Fifth Ave., New York 1.

Dec. 4-6, Electric Industrial Truck Association: Meeting, Hotel McAlpin, New York. EITA is located at 3701 N. Broad St., Philadelphia.

Dec. 5, National Welding Supply Association: Southeastern zone meeting, Hotel Patten, Chattanooga, Tenn. (Note next meeting)

Dec. 7, National Welding Supply Association: Southeastern zone meeting, Hotel Texas, Fort Worth, Tex. Address of association is 505 Arch St., Philadelphia 6.

Dec. 7-9, Electric Furnace Steel Committee, AIME: 8th annual meeting, William Penn Hotel, Pittsburgh. AIME headquarters: 29 W. 39th St., New York 18.

†**Dec. 11-12, American Management Association:** National Production Conference, Hotel Drake, Chicago. Association address is 330 W. 42nd St., New York 18.

Dec. 13-14, Power Crane and Shovel Association: Meeting, Edgewater Beach Hotel, Chicago. Association address is 74 Trinity Place, New York 6.

Dec. 14, Cutting Tool Manufacturers Association: Meeting, Recess Club, Detroit. 416 Penobscot Bldg., Detroit 26, is association address.

†**Dec. 14-15, Society of the Plastics Industry:** Second conference of plastics film, sheeting and coated fabrics division, Commodore Hotel, New York. Society is located at 295 Madison Ave., New York 17.

Electrical Contacts Abstracts

Bibliography and abstracts on electrical contacts is being supplemented for the sixth time since it was issued in January, 1944, by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. The bibliography section in this 1949 supplement, designated 56-F, is said to be 20 per cent larger than the 1948 edition, this increase representing revival of work along the lines reported in various parts of the world. Some work on the fundamental physics of contact application is reported.

Original bibliography of 148 pages is available at $5.00 while the first and second supplement are offered at $1.50 and all others at 75 cents each. The bibliography with all supplements is available for $6.75.

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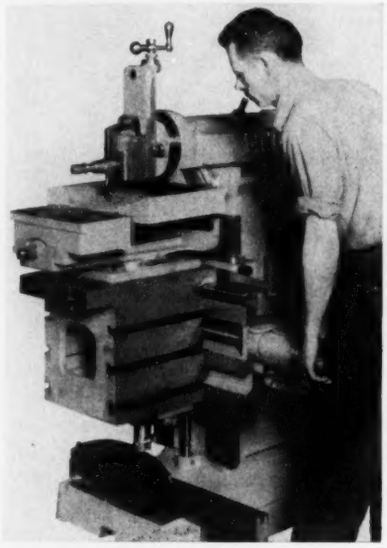
New Products and Equipment

Follower Shapes Contours

Automatic shaping of contours on dies, clamps, cams and other parts without laying out the contour on the work is possible with a follower type shaper marketed by Cincinnati Shaper Co., Hopple, Garrard & Elam Sts., Cincinnati 25, O. Equipment can be supplied in any stroke or size of Cincinnati shaper, as it is a standard machine except for the pad on the base, the master form holder and a special table support post. It can be used for regular shaper work as well as automatic duplicating.

Rail elevating screw is disconnected and retracted when duplicating so



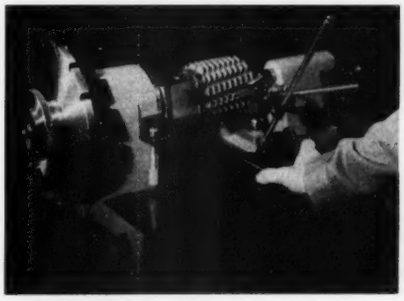
that the table and rail are free to move vertically. Rail and table are supported on the master form by the steel support post equipped with a roller. Master form to be duplicated is made of ½-inch steel and clamped to the holder secured to the pad on the base. The table, rail, and work follow the vertical and horizontal movement of the roller as it travels over the master form. Limiting angle of climb is about 20 dgrees.

Check No. 1 on Reply Card for more Details

Hob Checker Measures Errors

Barber-Colman Co., Rockford, Ill., is announcing a hob sharpening checker for measuring inaccuracies in hobs or formed cutters due to face sharpening. It inspects radialism, flute-to-flute spacing, total spacing, face offset and accuracy of straight flutes with the axis of hobs and cutters. It may also be used for checking runout of faces and outside diameters of hubs as well as the outside diameter runout of hob or cutter itself.

Checker utilizes standard index plates of the Barber-Colman No. 10-12 hob sharpening machine. Index



is held to plus or minus 0.0005-inch adjacent and plus or minus 0.0015-inch total error. Checking is done by means of an indicator mounted on surface plate.

Check No. 2 on Reply Card for more Details

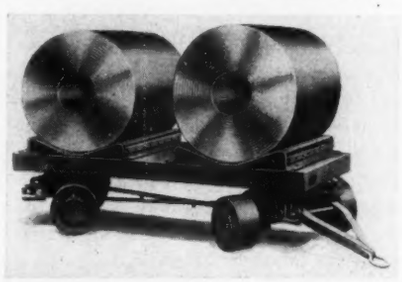
Wet and Dry Pickup Cleaner

Dry air only is used for cooling the continuous rated motor in a multistage suction cleaner developed by National Super Service Co. Inc., Toledo, O. Adaptable for both wet and dry pickup, the model BP vacuum cleaner draws free atmospheric air into the motor housing, this being entirely independent of and sealed off from the suction air. Motor rating is 1 hp, developing a maximum water lift of 56 inches at a maximum temperature rise of 30° C in continuous operation.

Check No. 3 on Reply Card for more Details

Transports Coiled Strip

Designed for carrying two coils of strip 48 inches in diameter is a 10-ton capacity trailer manufactured by Phillips Mine & Mill Supply Co., 2309 Jane St., Pittsburgh 3, Pa. The tractor-drawn trailer is arranged so



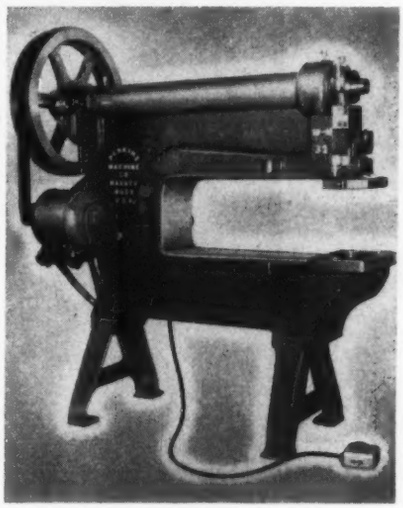
that the strip will ride in tandem on V-blocks. A rubber covering on the blocks prevents steel damage.

Danger of tipping is reduced by a wide steel base and low center of gravity. Bed height is 24 inches, width 26 inches and overall body length 102 inches. It is equipped with solid rubber-tired wheels and Timken roller bearings.

Check No. 4 on Reply Card for more Details

Special Purpose Presses

Versatility, economy of operation, low upkeep cost, convenience of operation and accessibility of dies for quicker changes have been incorporated in two extra capacity, special purpose presses announced by Perkins Machine Co., Warren, Mass. No. 201-S long-stroke press has an effective stroke of 7 inches and throat clearance from bed to ways of 21



inches. Column is tilted back for more convenient operation. It has a back gear drive powered by a 1 hp motor.

Illustrated is No. 10-M-32 press of deep-throat type for a wide variety of work. All moving parts and dies are accessible. Of the flywheel type, it is driven by a 1½ hp motor.

Check No. 5 on Reply Card for more Details

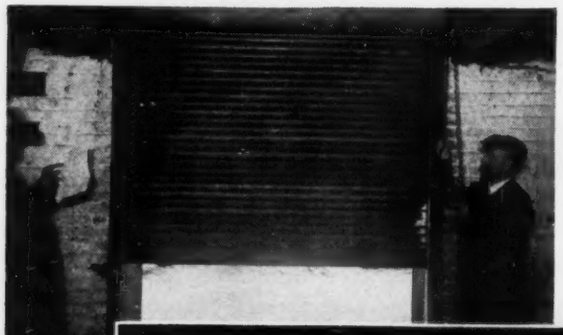
Side Register Control

Automatically and accurately maintaining the lateral position of a moving web of material on slitting, rewinding, and other processing machines, is an electronic side register control developed by General Electric Co., Schenectady 5, N. Y. Control responds to a signal from a printed line on paper, plastic or cloth of 1/32-inch minimum width. It ignores all signals from printing adjacent to the guide line on the trailing edge of the scanning sweep.

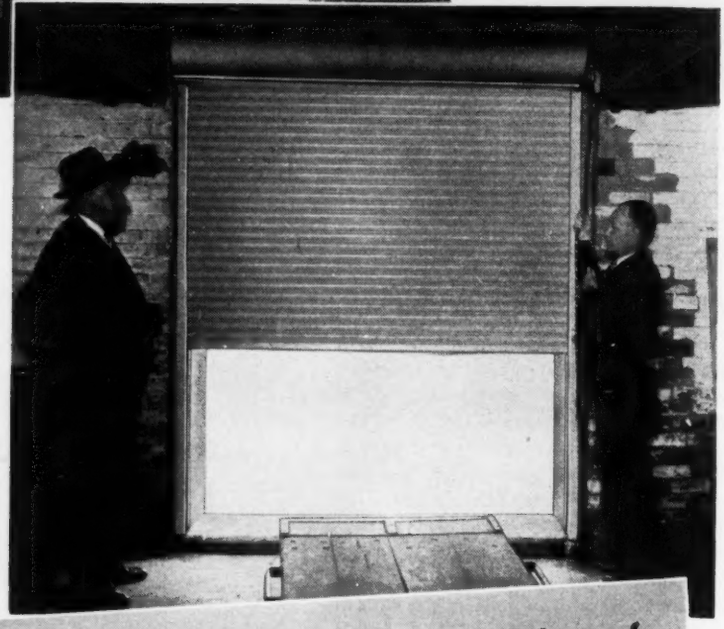
Broken lines of the same width can be followed. Instantaneous response is provided for errors as small as

47 YEARS OF SERVICE

and a few repairs make it ready for 47 more



The door at left has been in continuous service since 1903—for 47 years! The picture was taken this year, just before curtain slats were replaced and a few minor repairs made. In the photo below, the door is ready for many more years of efficient service and protection.



Another User Proves the Extra Value of KINNEAR Steel Rolling Doors

You can find many similar records of long service for these famous doors in the Kinnear files—more proof that their interlocking steel-slat construction, *originated by Kinnear,* combines rugged durability and protection with smooth action and space-saving efficiency.

Kinnear Rolling Doors open straight upward and coil completely out of the way above the lintel. All surrounding floor, wall and ceiling space is fully usable at all times, because the doors need no extra room for opening and closing action.

When closed, these all-steel doors give an extra measure of protection against fire, theft, intrusion, wind and weather, or accidental damage.

Kinnear Rolling Doors, built to fit openings of any size, are easily installed in old or new buildings. Equipped for operation by hand-lift, chain, crank or electric motor. With Kinnear Motor Operators, they offer the added convenience of push-button control, plus remote controls at any number of points, if desired. Write today for complete information.

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

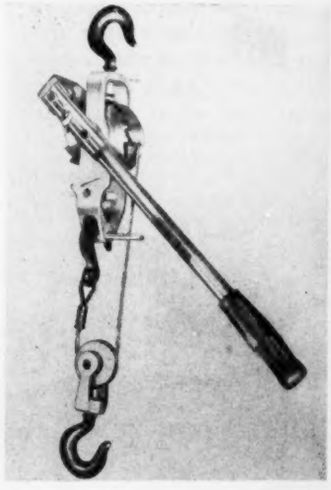
The KINNEAR Manufacturing Co.
FACTORIES: 1780-1800 Fields Ave.—Columbus 16, O.
1742 Yosemite Ave.—San Francisco 24, California.
Offices and Agents in All Principal Cities

0.001-inch or less. Unit is made up of two components: A rotary lens web scanner, and a thyratron control panel. Direction of scanning can be selected. The thyratron unit is capable of handling motors up to 2/3-hp.

Check No. 6 on Reply Card for more Details

Portable Winch-Hoist

With a 30 to 1 power ratio and tested for a 100 per cent overload, a 1½-ton alloy winch-hoist, built by Lug-All Co., Wynnewood, Pa., weighs only 8½ pounds. Features include preformed flexible aircraft



cable, stainless steel fittings and spring and oiled-for-life bearings.

Handle is reversible and acts as a safety valve to protect the user. Handle can be removed in 10 seconds, leaving the equipment tamperproof. Combination of three swivel hooks and a built-in pulley block allows work to be done around corners and as close as 10 inches at the ¾-ton rating. Hoist may be operated in any position and may be set for forward, reverse or free wheeling. Ten feet of cable winds onto the drum; extensions of any length are available.

Check No. 7 on Reply Card for more Details

Center Control Fork Truck

Loads of 5000 and 6000 pounds may be handled safely with operator comfort by the type FT center-control fork truck made by Baker Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O. It has outside turning radius of 79 inches and can make a right angle turn in 98 inches plus length of load. Telescoping lift will raise material 126 inches. A unit-welded steel plate frame contains an integral hydraulic tank.

Heavy formed channels welded into a unit assembly form the upright

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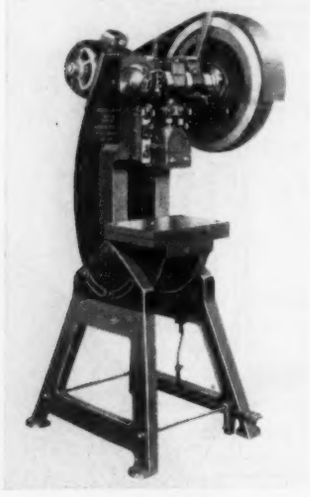
guides. Design of pivot, tilt and hose connections allows upright to be removed in 20 minutes. Lift and tilt mechanism is hydraulically operated. When operating the truck, the operator sits on the left side, giving him

an unobstructed view. Controller is of the NoPlug dynamic braking type. Direction is selected by manual control and speed is selected by a five-speed foot-operated accelerator.

Check No. 8 on Reply Card for more Details

Open Back Inclinable Press

Equipped with a sliding key clutch with 4-point engagement ring and a roller bearing mounted flywheel is a Press-Rite No. 1½, 15-ton open back inclinable press marketed by



Sales Service Machine Tool Co., 2363 University Ave., St. Paul 4, Minn. Crankshaft diameter at the bearing is 2⅛ inches and at the pin 2⅜ inches. Ram has V-ways with triple lubrication.

Standard stroke is 2 inches, but longer strokes up to 3 inches are available. Flywheel is 20¼ inches in diameter and reaches a speed of 160 rpm with a ¾-hp, 1140 rpm motor. Bolster area is 10 x 14⅜ inches. Throat depth is 5½ inches, and distance from bolster to slide with stroke down and adjustment up is 6¾ inches.

Check No. 9 on Reply Card for more Details

Machine Speeds Gear Testing

Rapid rate at which pinions are tested in this Red Ring gear tester, built by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich., is the result of the design features of the machine itself. Used to test for nicks by running them in mesh with a master gear, the machine protects the operator by keeping both hands occupied while pow-

er is on and by immediately breaking the action when the power is shut off.

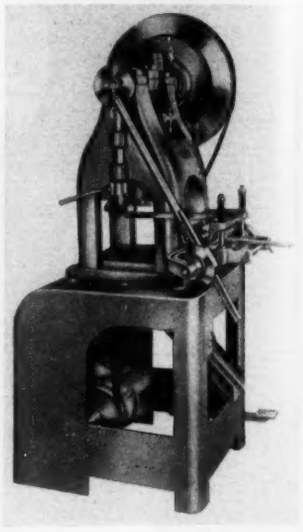
Workhead rocks about a central fulcrum with a compression spring normally holding it in an elevation that allows the pinion and master gear to be in very loose mesh, so that the work pinion may be slipped on and off readily. A safety interlock prevents the power from being turned on. With work pinion on its spindle and in loose mesh with the master gear, the rocking handle is pulled forward to bring the two gears in close mesh or to a predetermined center distance.

Check No. 10 on Reply Card for more Details

High Speed Press

Di Machine Corp., 2711 W. Irving Park Rd., Chicago 18, Ill. is offering the Diebel 8-ton high speed automatic press which features a cylinder type ram sliding in an adjustable bronze sleeve for greater accuracy and longer life. A variable speed drive permits selection of any speed from 110 to 350 strokes per minute. A built-in roll feed of either single or double construction is easily set and maintains a high degree of accuracy.

Ram is a 5-inch diameter ground cylinder with split clamp to accom-

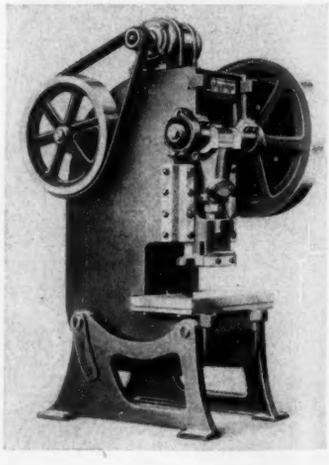


modate a 1 9/16-inch diameter by 2⅛-inch long die shank. Chrome nickel steel crankshaft is heat treated and ground. Feed rollers can be furnished hardened and ground, rubber coated or knurled.

Check No. 11 on Reply Card for more Details

10 to 200 Ton Presses

Two basic designs, one for presses up to 45 tons capacity, and another for heavier and larger units, are incorporated in the line of single crank open back inclinable and gap presses



offered by Columbia Machinery & Engineering Corp., Hamilton, O. Designed for stamping, drawing, blanking and embossing, the line includes open back inclinable presses from 10 to 200 tons capacity and gap presses from 60 to 200 tons. Smaller presses feature a cone-type clutch located in such a place on the crankshaft that the flywheel is outside the

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YOU'LL encounter stainless steel before you even get inside many a restaurant these days—on the marquee, building-front, sign or show window. There's a lot more in the dining-room—on the tables, the serving-stands, and in decorative notes. And back in the kitchens there's a veritable blaze of shining stainless steel . . . utensils, cabinets, work surfaces, ovens, mixers, walk-in refrigerators, washing machines—almost everything you see, everywhere you look.

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housing, permitting use of a smaller bull gear. This allows more room for die setup and operation.

Both open back inclinable and gap presses in larger sizes use the Alcone aluminum cone-type clutch which reduces size and weight with a correspondingly large reduction in flywheel effect. Presses may be inclined to a maximum of 25 degrees from vertical. All presses in the line are of all-welded rolled steel construction with cast-iron slides, extra long gibways, and high strength cast iron pitmans. Larger models have a plug type blocking device on the pitmans.

Check No. 12 on Reply Card for more Details

Hot Start Control Transformer

Measuring 12 x 17 x 23 inches, a small arc welder offered by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y., is designed to cover a wide range of applications from light duty sheet metal jobs to the industrial work. The MCX unit has a 200 amp 50 per cent duty cycle NEMA rating and employs an automatic hot start control with hermetically sealed gas-filled, time-delay relay magnetic switch.

Three current ranges selected by insulated tapered plug connectors and infinite hand crank adjustments within each range provide currents from 30 to 250 amp, permitting use of 1/16 to 3/16-inch diameter electrodes. Silicone insulation gives provision for operation safety at high temperatures and provides water repellency.

Check No. 13 on Reply Card for more Details

• • •

FAST DRYING: Fast rate of drying, unusual stability and resistance to severe conditions met in electrical service are features of No. 32 red oilproof enamel, introduced by Irvington Varnish & Insulator Co., Irvington 11, N. J. It air dries to handle in half an hour and dries hard in eight hours.

Check No. 14 on Reply Card for more Details

SHOP BOXES: Steel shop boxes, made by Lyon Metal Products Inc., Aurora, Ill., are available in five different styles. Style RB can be stacked on floor and used for regular bin type storage. Hopper end permits easy removal of contents from the box.

Check No. 15 on Reply Card for more Details

RECORDING INSTRUMENT: Type 5-116 recording oscillograph, made by Consolidated Engineering Corp., Pasadena 4, Calif., is designed so that neither sprocket teeth nor a pressure roller is required to provide positive record engagement. A new prefocused galvanometer lamp provides an efficient source of light for galvanometers. Using this source, the unit is capable of writing speeds of about 25,000 inches per second on Eastman Linagraph 1127.

Check No. 16 on Reply Card for more Details

EASY EXPANSION: A carbide-tipped expansion reamer that permits easy expansion wherever a true hole and fine finish are needed, is announced by Wendt-Sonis Co., Hannibal, Mo. It is available in sizes from ⅜-inch to 1½ inches, both straight and taper shank.

Check No. 17 on Reply Card for more Details

ANTICORROSIVE WRAPPING: Chippaflex VPI (vapor phase inhibitor), marketed by Chippewa Paper Products Co. Inc., Chicago, Ill., is a protective packaging material that has the property of inhibiting metal corrosion as well as affording the protection of the flexible corrugated wrap. Clean metal parts can be wrapped dry in it for corrosion protection. It needs no heat or adhesive seals.

Check No. 18 on Reply Card for more Details

POWER TOOL: Balanced and shaped to fit the hand, the Handee 85 tool, made by Chicago Wheel & Mfg. Co., Chicago 7, Ill., has an idling speed of 27,000 rpm and a load speed of 20,000 rpm. It weighs 2 pounds and chucks interchangeable spring collets of $\frac{1}{16}$, $\frac{3}{32}$ and ⅛-inch capacity.

Check No. 19 on Reply Card for more Details

METAL FLOOR TRUCKS: Models 4A and 4B are included in the new line of metal floor trucks offered by Industrial Engineering & Mfg. Co., Brimfield, Ind. Both models are 60 inches long and 30 inches wide. Model 4A is 30 inches high and 4B is 48 inches high and provides a greater capacity than model 4A.

Check No. 20 on Reply Card for more Details

CARTRIDGE REFILLS: S type oil purification cartridge refills are available from Honan-Crane Corp., Lebanon, Ind. It contains 4½ pounds of Palconia, a carefully blended cellulose fiber, tightly packed in woven cotton sock material. Fiber center tube simplifies disposal of spent cartridge as entire unit is completely consumed by burning.

Check No. 21 on Reply Card for more Details

MOTOR STARTER: A combination Life-Linestarter, class 11-206-N, combining motor starter, motor protection and disconnect in a redesigned enclosure to save space and increase safety, is available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Designed for across-the-line starting of squirrel cage induction motors or as a primary switch for wound rotor motors, it features new Life-Linestarter, AB de-ion circuit breaker and slamproof self-indicating interlocked handle.

Check No. 22 on Reply Card for more Details

SQUARE CYLINDERS: Modernair Corp., Oakland 8, Calif., introduces Square Circle cylinders. Diverse interchangeable mountings, machined from solid bar stock, permit a variety of applications with a single cylinder. Fixed or adjustable cushions are available for either or both end of all cylinder sizes ranging from 2½ inches up.

Check No. 23 on Reply Card for more Details

METER FOR TESTING: Model B-3 multicombination meter for electrolysis, corrosion and cathodic protection testing, made by M. C. Miller, West Englewood, N. J., has a low range of 2 millivolts and special mirror scales 3.9 inches long. The accuracy is 1 per cent.

Check No. 24 on Reply Card for more Details

AIR HAMMER: Burgess Thomas Co., Bloomfield, N. J., offers a powerful air tool for drilling, chipping, trimming, riveting, sealing, scaling and all round general applications. Hammer operates when pressed into contact with the work, stops when withdrawn.

Check No. 25 on Reply Card for more Details

PICKLING INHIBITOR: Inhibitor 8, announced by Enthone Inc., New Haven, Conn., is particularly recommended for pickling of wire. It has high inhibiting action in many types of mineral acids including hydrochloric, sulphuric and phosphoric acids, complete miscibility with pickling solutions. This nonodorous liquid can be readily removed by the use of alkali cleaners or by good running rinses.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

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Market Summary

FABRICATORS' steel inventories are melting away fast, hastening the time when drastic curtailments in civilian goods manufacturing schedules will be necessary. More metalworking shops are being forced to match production scheduling with receipts of steel shipments. They are operating on a virtual hand-to-mouth supply basis. In some instances, jobbing shops, unable to obtain sufficient steel to fulfill commitments, are relinquishing contracts. And this is only the beginning with steady worsening of supply conditions indicated in the months immediately ahead under impact of rising defense and related emergency requirements.

SHORTAGES— Critically short supplies of nonferrous metals are contributing seriously to manufacturers' difficulties. Resort to substitute grades of steel and other metals in the past served to sustain manufacturing in times of supply stringency, but substitution offers only limited possibilities in present circumstances with virtually all metals and materials in progressively short supply position. Scarcity of some steel products is being intensified by lack of adequate supplies of essential materials. For example, output of galvanized steel products is hampered by the acute shortage of zinc, while limited supplies of nickel are restricting production of certain alloys.

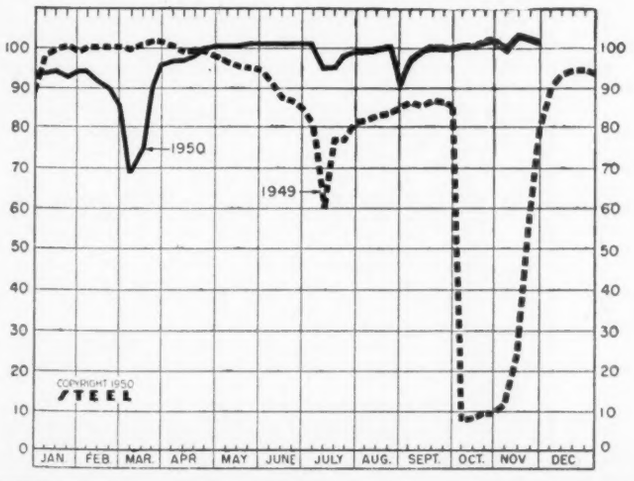
CARRYOVER— The steel mills will enter 1951 with heavy tonnage carryover. In sheets and strip it is expected the arrearage will range between four to six weeks with hot-rolled items constituting the largest unfilled commitments. Most consumers are letting their unfilled orders remain on mill books rather than take up the option given them of respecifying against reduced allotments. Sellers are booked into March on rated hot-rolled sheets, and through most of February on cold-rolled. Silicon grades are booked through March on rated orders. No limitation has been placed by the mills on rated tonnage acceptance, from regular customers in particular, with the result some consumers have received definite mill commitments on specified tonnage of rated orders on a month-by-month basis through 1951.

PRODUCTION— Steelmaking operations held steady last week at 102.5 per cent of capacity, only 1.5 points under the all-time high registered three weeks ago and equivalent to production of some 1,980,000 tons of ingots and steel for castings. Barring an unlooked-for setback, the industry is expected to attain a new monthly production record in November. Through October when the all-time monthly high was scored, 8,718,987 net tons, production exceeded the 8-million ton mark for seven consecutive months.

PRICES— Except for upward revision in contract prices on tin mill products for 1951 averaging about 12 per cent, the market was devoid of feature pricewise last week. Carnegie-Illinois Steel Corp. announced a new method of quoting tin plate under which a price base is set up at each producing mill and revised extras and dedutions are established for each of the different tin mill product classifications. This is the first major change in tin mill product pricing since production was started in this country many years ago. The changed procedure is designed to more realistically reflect technological developments in recent years. General advance in steel prices is believed on the way despite government pressure on the producers to absorb cost increases. Announcement of new schedules is expected just as soon as wage negotiations are out of the way. An average increase of up to $10 per ton is expected.

COMPOSITES— STEEL's weighted index of finished steel prices is steady at 157.76, as is the arithmetical average at $95.09. Pig iron composites are unchanged with basic, $49.04, No. 2 foundry, $49.54 and malleable, $50.27. Underlying strength is developing in the scrap market and steelmaking grades are firm with the composite price at $41.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Nov. 25	Change	Same Week 1949	Same Week 1948
Pittsburgh	104	0*	79	96.5
Chicago	105	+ 1	79	98.5
Eastern Pa.	100	0	80	95
Youngstown	102	— 2	90	105
Wheeling	99.5	0	99	95.5
Cleveland	101	— 1*	91.5	96.5
Buffalo	104	0	101	104
Birmingham	100	0	62	100
New England	91	0	87	90
Cincinnati	103	— 3	60	103
St. Louis	95	0	87	84.5
Detroit	106	0	101	99
Western	101	0	71	..
Estimated national rate	102.5	0	80	99

Based on weekly steelmaking capacity of 1,906,268 net tons for first half and 1,928,721 second half, 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948. * Change from revised rate.

News Summary—p. 25 Production-Engineering News—p. 55

Composite Market Averages

	Nov. 22 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	157.76	157.76	157.68	152.52	101.87
Index in cents per lb. ..	4.274	4.274	4.272	4.132	2.760
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$95.09	$95.09	$95.09	$91.64	$58.27
No. 2 Fdry, Pig Iron, GT	49.54	49.54	49.35	46.10	25.42
Basic Pig Iron, GT	49.04	49.04	48.10	45.60	24.75
Malleable Pig Iron, GT..	50.27	50.27	49.63	47.27	26.04
Steelmaking Scrap, GT..	41.00	41.67	41.67	29.83	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39. Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Nov. 22 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	**3.45**	**3.45**	**3.45**	**3.35**	**2.25**
Bars, H.R., Chicago	**3.45**	**3.45**	**3.45**	**3.35**	**2.25**
Bars, H.R., del. Philadelphia	**3.93**	**3.93**	**3.93**	**3.83**	**2.57**
Bars, C. F., Pittsburgh....	**4.15**	**4.15**	**4.15**	**3.95-4.00**	**2.75**
Shapes, Std., Pittsburgh ..	**3.40**	**3.40**	**3.40**	**3.25**	**2.10**
Shapes, Std., Chicago	**3.40**	**3.40**	**3.40**	**3.25**	**2.10**
Shapes, del. Philadelphia..	3.46	3.46	3.46	3.50	2.215
Plates, Pittsburgh	**3.50**	**3.50**	**3.50**	**3.40**	**2.25**
Plates, Chicago	**3.50**	**3.50**	**3.50**	**3.40**	**2.25**
Plates, Coatesville, Pa. ...	**3.90**	**3.90**	**3.90**	**3.50**	**2.25**
Plates, Sparrows Point, Md.	**3.50**	**3.50**	**3.50**	**3.40**	**2.25**
Plates, Claymont, Del. ...	**3.90**	**3.90**	**3.90**	**3.50**	**2.25**
Plates, del. Philadelphia ..	**3.84**	**3.84**	**3.84**	**3.59**	**2.30**
Sheets, H.R., Pittsburgh..	**3.35**	**3.35**	**3.35**	**3.25**	**2.20**
Sheets, H.R., Chicago	**3.35**	**3.35**	**3.35**	**3.25**	**2.20**
Sheets, C.R., Pittsburgh ..	**4.10**	**4.10**	**4.10**	**4.00**	**3.05**
Sheets, C.R., Chicago	**4.10**	**4.10**	**4.10**	**4.00**	**3.05**
Sheets, C.R., Detroit	**4.30**	**4.30**	**4.30**	**4.20**	**3.15**
Sheets, Galv., Pittsburgh..	**4.40**	**4.40**	**4.40**	**4.40**	**3.70**
Strip, H.R., Pittsburgh ...	**3.50-75**	**3.50-75**	**3.50-75**	**3.25**	**2.10**
Strip, H.R., Chicago	**3.25**	**3.25**	**3.25**	**3.25**	**2.10**
Strip, C.R., Pittsburgh	**4.15-85**	**4.15-85**	**4.15-50**	**4.00**	**2.80**
Strip, C.R., Chicago	**4.30**	**4.30**	**4.30**	**4.00-15**	**2.90**
Strip, C.R., Detroit	**4.35-5.10**	**4.35-5.10**	**4.35-95**	**4.20-25**	**2.90**
Wire, Basic, Pittsburgh ...	**4.50-75**	**4.50-75**	**4.50-75**	**4.15**	**2.75**
Nails, Wire, Pittsburgh ...	**5.30-60**	**5.30-60**	**5.30-60**	**5.15**	**2.90**
Tin plate, box, Pittsburgh.	**$7.50**	**$7.50**	**$7.50**	**$7.75**	**$5.00**

SEMIFINISHED

Billets, forging, Pitts.(NT)	**$63.00**	**$63.00**	**$63.00**	**$61.00**	**$42.00**
Wire rods, ⅜-⅝", Pitts...	**3.85**	**3.85**	**3.85**	**3.40**	**2.15**

PIG IRON, Gross Ton

Bessemer, Pitts.	$50.00	$50.00	$47-$50	$47.00	$26.25
Basic, Valley	49.00	49.00	46-49	46.00	25.25
Basic, del. Phila.	53.39	53.39	53.39	49.44	27.09
No. 2 Fdry, Pitts.	49.50	49.50	49.50	46.50	25.75
No. 2 Fdry, Chicago	49.50	49.50	49.50	46.50	25.75
No. 2 Fdry, Valley	49.50	49.50	49.50	46.50	25.75
No. 2 Fdry, del. Phila. ...	53.89	53.89	53.89	49.94	27.59
No. 2 Fdry, Birm.	45.88	45.88	45.88	39.38	22.13
No. 2 Fdry (Birm.) del. Cin.	52.58	52.58	52.58	46.06	25.81
Malleable, Valley	49.50	49.50	49.50	46.50	25.75
Malleable, Chicago	49.50	49.50	46.50-49.50	46.50	25.75
Charcoal, Lyles, Tenn. ...	62.00	62.00	62.00	60.00	33.00
Ferromanganese, Etna, Pa.	175.0	175.00	175.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$44.00	$44.00	$44.00	$33.50	$20.00
No. 1 Heavy Melt. E. Pa..	39.00	41.00	41.00	26.50	18.75
No. 1 Heavy Melt. Chicago	40.00	40.00	40.00	29.50	18.75
No. 1 Heavy Melt. Valley.	43.75	43.75	43.75	32.75	20.00
No. 1 Heavy Melt. Cleve...	43.25	43.25	43.25	30.25	19.50
No. 1 Heavy Melt. Buffalo.	41.50	41.50	41.50	29.75	19.25
Rails, Rerolling, Chicago..	64.50	64.50	64.50	44.50	22.25
No. 1 Cast, Chicago	59.00	59.00	53.50	42.50	20.00

Coke, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$13.25	$7.50
Beehive, Fdry., Connlsvl...	16.50	16.50	16.50	15.75	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.00	13.00

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	18.50	12.00
Zinc, E. St. Louis	17.50	17.50	17.50	9.75	8.25
Lead, St. Louis	16.80	16.80	15.80	11.80	6.35
Tin, New York	nom.	130.00	119.25	85.00	52.00
Aluminum, del.	19.00	19.00	19.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	32.00	32.00	14.50
Nickel, refinery, duty paid.	48.00	48.00	48.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$51.00	$51.50	$52.00	$52.50
Brooklyn,N.Y.,del.	....	55.79	56.29	....
Newark,del.	53.63	54.13	54.63	55.13
Philadelphia,del.	53.39	53.89	54.39	54.89
Birmingham District				
AlabamaCity,Ala. R2	45.38	45.88	....	....
Birmingham R2	45.38	45.88	....	....
Birmingham S9	45.38	45.88	....	....
Woodward,Ala. W15	45.38	45.88	....	....
Cincinnati,del.	....	52.58	....	....
Buffalo District				
Buffalo H1, R2	49.00	49.50	50.00	....
Tonawanda,N.Y., W12	49.00	49.50	50.00	....
N.Tonawanda,N.Y., T9	....	49.50	50.00	....
Boston,del.	58.26	58.76	59.20	....
Rochester,N.Y.,del.	51.63	52.13	52.63	....
Syracuse,N.Y.,del.	52.58	53.08	53.58	....
Chicago District				
Chicago I-3	49.00	49.50	49.50	50.00
Gary,Ind. C3	49.00	....	49.50	....
IndianaHarbor,Ind. I-2	49.00	....	49.50	....
So.Chicago,Ill. W14	49.00	49.50	49.50	....
So.Chicago,Ill. Y1	49.00	49.50	49.50	....
So.Chicago,Ill. C3	49.00	....	49.50	50.00
Milwaukee,del.	50.89	51.39	51.39	51.89
Muskegon,Mich.,del.	....	54.98	54.98	....
Cleveland District				
Cleveland A7	49.00	49.50	49.50	50.00
Cleveland R2	49.00	49.50	49.50	....
Akron, del. from Cleve.	51.39	51.89	51.89	51.39
Lorain,O. N3	49.00	....	....	50.00
Duluth I-3	....	....	49.50	....
Erie,Pa. I-3	49.00	49.50	49.50	50.00
Everett,Mass. E1	....	52.25	52.75	....
Fontana,Calif. K1	55.00	55.50	....	....
Geneva,Utah G1	49.00	49.50	....	....
Seattle,Tacoma,Wash.,del.	....	57.20	....	....
Portland,Oreg.,del.	....	57.20	....	....
LosAngeles,SanFrancisco,del. ...	56.70	57.20	....	....
GraniteCity,Ill. M10	50.90	51.40	51.90	....
St.Louis,del. (inc. tax)	51.65	52.15	52.65	....
Ironton,Utah C11	49.00	49.50	....	....
LoneStar,Tex. L6	45.00	*45.50	45.50	....
Minnequa,Colo. C10	49.00	49.50	50.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	49.50	49.50	50.00
Pitts.,N.&S. sides, Ambridge, Aliquippa, del.	....	50.69	50.69	51.19
McKeesRocks,del.	....	50.45	50.45	50.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	....	50.94	50.94	51.44
Verona,del.	....	51.40	51.40	51.90
Brackenridge,del.	....	51.63	51.63	52.13
Bessemer,Pa. C3	49.00	....	49.50	50.00
Clairton,Rankin,So.Duquesne,Pa. C3	49.00	....	....	....
McKeesport,Pa. N3	49.00	....	....	50.00
Sharpsville,Pa. S6	....	....	49.50	50.00
Steelton,Pa. B2	51.00	51.50	52.00	52.50
Swedeland,Pa. A3	53.00	53.50	54.00	54.50
Toledo,O. I-3	49.00	49.50	49.50	50.00
Cincinnati,del.	54.01	54.51	....	....
Troy,N.Y., R2	51.00	51.50	52.00	52.50
Youngstown District				
Hubbard,O. Y1	49.00	49.50	49.50	....
Youngstown Y1	49.00	49.50	49.50	50.00
Mansfield,O.,del.	53.26	53.76	53.76	54.26

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$83.00
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	89.50
Keokuk, OH & Fdry., 12½ lb. piglets, 16% Si, frt. allowed K2.	92.50
Wenatchee,Wash., O.H. & Fdry., frt. allowed K2	89.50

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$62.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$54.00
Steelton,Pa. B2	57.00
Philadelphia delivered	60.00
Troy,N.Y. R2	57.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL Nov. 22, 1950; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 .....$50.00
Fontana,Calif. K1 ....76.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)
Detroit R7 .....$51.00
Fontana,Calif. K1 ....77.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ..51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 ....$53.00
Clairton,Pa. C3 .....53.00
Conshohocken,Pa. A3 ..62.00
Ensley,Ala. T2 .....53.00
Fairfield,Ala T2 .....53.00
Fontana,Calif. K1 ....72.00
Gary,Ind. C3 .....53.00
Johnstown,Pa. B2 ....53.00
Lackawanna,N.Y. B2..53.00
Munhall,Pa. C3 .....53.00
So.Chicago,Ill. C3 ...53.00
So.Duquesne,Pa. C3 ...53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 .....$63.00
Buffalo R2 .....63.00
Canton,O. R2 .....63.00
Clairton,Pa. C3 .....63.00
Cleveland R2 .....63.00
Conshohocken,Pa. A3 ..68.00
Detroit R7 .....66.00
Ensley,Ala T2 .....63.00
Fairfield,Ala. T2 .....63.00
Fontana,Calif. K1 ....82.00
Gary,Ind. C3 .....63.00
Geneva,Utah G1 .....63.00
Houston,Tex. S5 .....71.00
Ind.Harbor,Ind. I-2 ....63.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2 .63.00
LosAngeles B3 .....82.00
Munhall,Pa. C3 .....63.00
Seattle B3 .....82.00
So.Chicago C3,R2,W14.63.00
So.Duquesne,Pa. C3 ..63.00
So.SanFrancisco B3 ...82.00

Alloy (NT)
Bethlehem,Pa. B2 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2, T7 ....66.00
Conshohocken,Pa. A3..70.00
Detroit R7 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....66.00
Houston,Tex. S5 .....74.00
Ind.Harbor,Ind. Y1 ...66.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....86.00
Massillon,O. R2 .....66.00
Midland,Pa. C18 .....66.00
Munhall,Pa. C3 .....66.00
So.Chicago C3,R2,W14.66.00
So.Duquesne,Pa. C3 ..66.00
Warren,O. C17 .....66.00
Youngstown Y1 .....66.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Fontana,Calif. K1 ....100.00
Gary,Ind. C3 .....76.00
Ind.Harbor,Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00
So.Duquesne,Pa. C3 ...76.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$86.00

SKELP
Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.15
Warren,O. R2 .....3.15
Youngstown C3, R2 ....3.15

WIRE RODS
AlabamaCity,Ala. R2 ..3.85
Buffalo W12 .....3.85
Cleveland A7 .....3.85
Donora,Pa. A7 .....3.85
Fairfield,Ala. T2 .....3.85
Fontana,Calif. K1 ....4.60
Houston,Tex. S5 .....4.25
Ind.Harbor,Ind. Y1 ...3.85
Johnstown,Pa. B2 ....3.85
Joliet,Ill. A7 .....3.85
LosAngeles B3 .....4.65
Minnequa,Colo. C10 ....4.10
Monessen,Pa. P7 .....4.05
No.Tonawanda,N.Y. B11.3.85
Pittsburg,Calif. C11 ...4.50
Portsmouth,O. P12 ....3.85
Roebling,N.J. R5 .....3.95
So.Chicago,Ill. R2 ....3.85
SparrowsPoint,Md. B2..3.95
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....3.85
Torrance,Calif. C11 ...4.65
Worcester A7 .....4.15

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.40
Aliquippa,Pa. J5 .....3.40
Bessemer,Ala. T2 .....3.40
Bethlehem,Pa. B2 .....3.45
Clairton,Pa. C3 .....3.40
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 ....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2 ....3.40
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.00
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.00
Minnequa,Colo. C10 ...3.85
Munhall,Pa. C3 .....3.40
Niles,Calif.(22) P1 ....4.02
Phoenixville,Pa. P4 ...4.25
Portland,Oreg. O4 .....4.25
Seattle B3 .....4.05
So.Chicago,Ill. C3, W14.3.40
So.SanFrancisco B3 ....3.95
Torrance,Calif. C11 ....4.00
Weirton,W Va. W6 ....3.40

Alloy Stand. Shapes
Clairton,Pa. C3 .....4.06
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So. Chicago, Ill. C3 ....4.06

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.15
Bessemer,Ala. T2 .....5.15
Bethlehem,Pa.(14) B3 ..5.20
Clairton,Pa. C3 .....5.15
Fairfield,Ala. T2 .....5.15
Fontana,Calif. K1 ....5.75
Gary,Ind. C3 .....5.15
Geneva,Utah G1 .....5.10
Ind.Harbor,Ind. I-2 ....5.15
Ind.Harbor,Ind. Y1 ....5.40
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y.(14)B2 5.20
LosAngeles B3 .....5.75
Munhall,Pa. C3 .....5.15
So.Chicago,Ill. C3 .....5.15
So.SanFrancisco B3 ....5.70
Struthers,O. Y1 .....5.40

Wide Flange
BethlehemPa B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 ....3.40

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
Munhall,Pa. C3 .....5.10
So.Chicago,Ill C3 .....5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.20
Lackawanna,N.Y. B2 ..4.20
Munhall,Pa. C3 .....4.20
So.Chicago,Ill. C3 ....4.20
Weirton,W. Va. W6 ....4.20

BEARING PILES
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 ....3.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.35
Bessemer,Ala. T2 .....5.35
Clairton,Pa. C3 .....5.35
Cleveland J5, R2 .....5.35
Conshohocken,Pa. A3...5.60
Ecorse,Mich. G5 .....5.35
Fairfield,Ala. T2 .....5.35
Fontana,Calif. K1 ....5.95
Gary,Ind. C3 .....5.35
Geneva,Utah G1 .....5.35
Ind.Harbor,Ind. I-2, ...5.35
Ind.Harbor,Ind. Y1 ....5.60
Johnstown,Pa. B2 .....5.35
Munhall,Pa. C3 .....5.35
Pittsburgh J5 .....5.35
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. C3 ....5.35
SparrowsPoint,Md. B2..5.35
Warren,O. R2 .....5.35
Youngstown Y1 .....5.60

PLATES, Open-Hearth Alloy
Claymont,Del. W16 ....4.80
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ..4.55
Fontana,Calif. K1 ....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.75
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

FLOOR PLATES
Cleveland J5 .....4.55
Conshohocken,Pa. A3 ..4.55
Harrisburg,Pa. C5 ....5.25
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 ....4.55

PLATES (Universal Mill)
Fontana,Calif. K1 ....4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.25

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.50
Aliquippa,Pa. J5 .....3.50
Ashland,Ky.(15) A10 ..3.50
Bessemer,Ala. T2 .....3.50
Clairton,Pa. C3 .....3.50
Claymont,Del. W16 ....3.90
Cleveland J5 R2 .....3.50
Coatesville,Pa. L7 .....3.90
Conshohocken,Pa. A3 ..3.75
Ecorse,Mich. G5 .....3.75
Fairfield,Ala. T2 .....3.50
Fontana,Calif. K1 ....4.10
Gary,Ind. C3 .....3.50
Granite City,Ill. G4 ....4.20
Geneva,Utah G1 .....3.50
Harrisburg,Pa. C5 ....4.25
Houston,Tex. S5 .....3.90
Ind.Harbor,Ind. I-2,Y1..3.50
Johnstown,Pa. B2 ....3.50
Lackawanna,N.Y. B2 ..3.50
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.50
Pittsburgh J5 .....3.50
Seattle B3 .....4.40
Sharon,Pa. S3 .....3.75
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2 ..3.50
Steubenville,O. W10 ....3.50
Warren,O. R2 .....3.50
Weirton,W.Va. W6 ....3.50
Youngstown C3, R2, Y1.3.50

PLATES, Wrought Iron
Economy,Pa. B14 ....7.85

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.75
Ashland,lcl(15) A10 ...4.25
Cleveland,cl. R2 .....4.10
Warren,O.cl R2 .....4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.45
Aliquippa,Pa. J5 .....3.45
Alton,Ill.(1) L1.....3.45
Atlanta,Ga. A11 .....4.00
Bessemer,Ala. T2 .....3.45
Buffalo R2 .....3.45
Canton,O. R2 .....3.45
Clairton,Pa. C3 .....3.45
Cleveland R2 .....3.45
Ecorse,Mich. G5 .....3.65
Emeryville,Calif. J7 ....4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 ....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 .....3.45
KansasCity, Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Milton,Pa. B6 .....3.70
Minnequa,Colo. C10 ....3.90
Niles,Calif. P1 .....4.17
N.Tonawanda,N.Y. B11.3.45
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.10
Seattle B3, N14 .....4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 ....3.45
S.SanFran.,Cal. B3 ....4.20
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Weirton,W.Va. W6 ....3.45
Youngstown C3, R2 ....3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa J5 .....3.45
Atlanta A11 .....4.00
Johnstown,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ...3.45
Niles,Calif. P1 .....4.17
Portland,Oreg. O4 ....4.20
SanFrancisco S7 .....4.00
Weirton,W.Va. W6 ....3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....3.95
Buffalo R2 .....3.95
Canton,O. R2, T7 .....3.95
Clairton,Pa. C3 .....3.95
Ecorse,Mich. G5 .....4.25
Fontana,Calif. K1 ....4.95
Gary,Ind. C3 .....3.95
Houston,Tex. S5 .....4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 .....3.95
KansasCity,Mo. S5 ....4.55
Lackawanna,N.Y. B2 ..3.95
LosAngeles B3 .....5.00
Massillon,O. R2 .....3.95
Midland,Pa. C18 .....3.95
So.Chicago C3, R2, W14.3.95
So.Duquesne,Pa. C3 ...3.95
Struthers,O. Y1 .....3.95
Warren,O. C17 .....4.20
Youngstown C3 .....3.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 .....4.20
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....4.20
Youngstown C3 .....4.20

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.20
Atlanta A11 .....5.35
Bessemer,Ala. T2 .....5.20
Bethlehem,Pa. B2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland R2 .....5.20
Ecorse,Mich. G5 .....5.65
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 ....6.25
Gary,Ind. C3 .....5.20
Ind.Harbor,Ind. I-2 ....5.20
IndianaHarbor,Ind. Y1..5.45
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
LosAngeles B3 .....5.90
Pittsburgh J5 .....5.20
So.Duquesne,Pa. C3 ....5.20
So.SanFrancisco B3 ...5.95
Struthers,O. Y1 .....5.45
Youngstown C3 .....5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 .....4.15
Ambridge,Pa. W18 ....4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 .....4.15
Camden,N.J. P13 .....4.60
Carnegie,Pa. C12 .....4.15
Chicago W18 .....4.15
Cleveland A7, C20 ....4.15
Detroit P17 .....4.30
Donora,Pa. A7 .....4.15
Ecorse,Mich. G5 .....4.35
Elyria,O. W8 .....4.15
FranklinPark,Ill. N5 ...4.15
Gary,Ind. R2 .....4.15
Hammond,Ind. L2, M13.4.15
Hartford,Conn. R2 ....4.55
Harvey,Ill. B5 .....4.15
LosAngeles R2 .....5.55
Mansfield,Mass. B5 ....4.55
Massillon,O. R2, R8 ...4.15
Midland,Pa. C18 .....4.15
Monaca,Pa. S17 .....4.15
Newark,N.J. W18 .....4.55
Plymouth,Mich. P5 ....4.40
Pittsburgh J5 .....4.15
Putnam,Conn. W18 ....4.55
Readville,Mass. C14 ...4.55
St.Louis,Mo. M5 .....4.55
So.Chicago,Ill. W14 ....4.15
SpringCity,Pa.(5) K3 ..4.55
Struthers,O. Y1 .....4.15
Waukegan,Ill. A7 .....4.15
Youngstown F3, Y1 ....4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 .....4.90
Ambridge,Pa. W18 ....4.90
BeaverFalls,Pa. M12 ...4.90
Bethlehem,Pa. B2 .....4.90
Buffalo B5 .....4.90
Canton,O. R2, T7 ....4.90
Carnegie,Pa. C12 .....4.90
Chicago W18 .....4.90
Cleveland A7, C20 ....4.90
Detroit P17 .....5.05
Donora,Pa. A7 .....4.90
Elyria,O. W8 .....4.90
Gary,Ind. R2 .....4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 ....5.20
Harvey,Ill. B5 .....4.90
Lackawanna,N.Y. B2 ..4.90
Mansfield,Mass. B5 ....5.20
Massillon,O. R2, R8 ...4.90
Midland,Pa. C18 .....4.90
Monaca,Pa. S17 .....4.90
Newark,N.J. W18 .....5.20
Plymouth,Mich. P5 ....5.10
So.Chicago,Ill. R2, W14.4.90
Struthers,O. Y1 .....4.90
Warren,O. C17 .....4.90
Waukegan,Ill. A7 .....4.90
Worcester,Mass. A7 ...5.20
Youngstown F3, Y1 ....4.90

RAIL STEEL BARS
ChicagoHts.(3)I-2, C2 ..4.00
ChicagoHts.(4)I-2 .....3.45
Dallas,Tex.(4) S20 ....6.00
Franklin,Pa.(3) F5 ....4.00
FortWorth,Tex.(26) T4..4.63
Huntngtn,W.Va.(3) W7.4.00
Marion,O.(3) P11 .....4.00
Moline,Ill.(3) R2 .....3.55
Williamsport(3) S19 ....4.50
Williamsport(4) S19 ....4.60

BARS, Wrought Iron
Economy,Pa.(S.R.) B14.8.60
Economy,Pa.(D.R.)B14 11.00
Economy(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 .12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ..11.25

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.45
Alton,Ill.(6) L1 .....3.45
Atlanta A11 .....4.00
Buffalo R2 .....3.45
Cleveland R2 .....3.45
Emeryville,Calif. J7 ....4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 ....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 ....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Milton,Pa. B6 .....3.70
Minnequa,Colo. C10 ....3.90
Monessen,Pa. P7 .....4.05
Niles,Calif. P1 .....4.17
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.70
Seattle B3, N14 .....4.20
So.Chicago,Ill. R2 ....3.45
So.Duquesne,Pa. C3 ....3.45
So.SanFrancisco B3 ....4.20
SparrowsPoint(36) B2 .5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 ....5.30
Youngstown, C3 .....5.05
Youngstown, Y1 .....5.30

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.20
Ecorse,Mich. G5 .....6.65
Fontana,Calif. K1 ....7.05
Gary,Ind. C3 .....6.20
Ind.Harbor,Ind. I-2, ...6.20
IndianaHarbor,Ind. Y1..6.45
Irvin,Pa. C3 .....6.20
Lackawanna(37) B2 ...6.20
Pittsburgh J5 .....6.20
SparrowsPoint(38) B2..6.20
Warren,O. R2 .....6.20
Weirton,W.Va. W6 ....6.45
Youngstown Y1 .....6.45

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity, Ala. R2..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 .....3.35
Cleveland J5, R2 .....3.35
Conshohocken,Pa. A3 ..3.60
Detroit M1 .....4.15
Ecorse,Mich.(8) G5 ...3.55
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 ....4.25
Gary,Ind. C3 .....3.35
GraniteCity,Ill. G4 ....4.05
Geneva,Utah G1 .....3.45
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 .....3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 .....3.35
Niles,O. N12 .....4.50
Pittsburg,Calif. C11 ...4.05
Pittsburgh J5 .....3.35
Sharon,Pa. S3 .....3.75
So.Chicago,Ill. W14 ....3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 ....3.35
Torrance,Calif. C11 ....4.05
Warren,O. R2 .....3.35
Weirton,W.Va. W6 ....3.35
Youngstown C3, Y1 ....3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 .....4.65
Ind.Harbor,Ind. I-2 ....4.40
Mansfield,O. E6 .....4.15
Niles,O. N12 .....5.00
Torrance,Calif. C11 ....5.15

SHEETS, H-R (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.05
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.50
Fairfield,Ala. T2 .....5.05
Fontana,Calif. K1 ....6.00
Gary,Ind. C3 .....5.05
Ind.Harbor,Ind. I-2 ....5.05
IndianaHarbor,Ind. Y1..5.30
Irvin,Pa. C3 .....5.05
Lackawanna(35) B2 ..5.05
Pittsburgh J5 .....5.05
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. C3 .....5.05
SparrowsPoint(36) B2 .5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 ....5.30
Youngstown, C3 .....5.05
Youngstown, Y1 .....5.30

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.20
Ecorse,Mich. G5 .....6.65
Fontana,Calif. K1 ....7.05
Gary,Ind. C3 .....6.20
Ind.Harbor,Ind. I-2, ...6.20
IndianaHarbor,Ind. Y1..6.45
Irvin,Pa. C3 .....6.20
Lackawanna(37) B2 ...6.20
Pittsburgh J5 .....6.20
SparrowsPoint(38) B2..6.20
Warren,O. R2 .....6.20
Weirton,W.Va. W6 ....6.45
Youngstown Y1 .....6.45

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.80
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	5.10
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind.(13) C16	4.80
MartinsFerry,O. W10	4.40
Niles,O. N12	5.50
Pittsburg, Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind.(13) C16	5.35
Niles,O. N12	6.05

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	5.30
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin,Pa. C3	6.35
SparrowsPoint,Md. B2	6.45
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.00
Follansbee,W.Va.(23) F4	5.70

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.80	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45
Fairfield,Ala. T2	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Wrought Iron	An'l	Galv.
Apollo,Pa. B14	12.60	16.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Well Casing

Fontana,Calif. K1	4.80

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10(cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill.G4(cut lengths)	...	...	7.40	8.65	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	...	6.50	7.00	...
Vandergrift,Pa. C3	...	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	...
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	...	...	...
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.20	14.70
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Ind.Har. I-2, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.80
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	5.10
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Atlanta(9) A11	5.10
Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	5.20
Ecorse,Mich. G5	5.40
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	5.90
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2	4.95
IndianaHarbor,Ind. Y1	5.20
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	5.70
Sharon,Pa. S3	5.30
So.SanFrancisco(25) B3	5.70
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	5.20
Youngstown Y1	5.20
Youngstown C3	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.45
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity, Mo. S5	5.70
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.45
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.25
Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.80
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.75
Buffalo(27) R2	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.75
Conshohocken,Pa. A3	3.50
Detroit M1	4.05
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.50
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.75
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.75
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.50
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	10.10
Carnegie,Pa. S18	10.10
Cleveland A7	9.50
Dover,O. G6	10.00
Fontana,Calif. K1	11.15
Harrison,N.J. C18	10.10
NewBritn.Conn.(10) S15	10.10
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	10.10
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.85	6.30	6.90	8.85	11.15
Bristol,Conn. W1	...	...	6.85	8.80	...
Carnegie,Pa. S18	...	6.30	6.90	8.85	11.15
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Detroit D2	5.10	6.15	6.75	...	...
Detroit(21) D2	5.35	6.25	6.85	...	...
Dover,O. G6	5.00	6.30	6.90	8.85	11.15
FranklinPark,Ill. T6	4.50	6.10	6.70	8.65	...
Harrison,N.J. C18	...	...	7.20	9.15	11.45
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.85	6.30	6.90	8.85	11.15
NewCastle,Pa. B4	4.85	6.30	6.90	8.85	...
NewCastle,Pa. E5	5.00	6.30	6.90	8.85	11.15
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8:					
Cleve-or-Pitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.85	6.30	6.90	8.85	11.15
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.15	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
[illegible]	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	10.05	12.00	14.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.00
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	4.85
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	5.10
Detroit D2	5.10
Detroit M1	4.95
Dover,O. (40) G6	5.00
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.85
Fontana,Calif. K1	5.75
FranklinPark,Ill. T6	4.50
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.85
Mattapan,Mass. T6	5.00
Middletown,O. A10	4.15
NewBritain(10) S15	4.85
NewCastle,Pa. B4	4.65
NewCastle,Pa.(40) E5	4.75
NewHaven,Conn. D2	5.35
NewHaven,Conn. A7	4.65
NewYork W3	5.00
Pawtucket,R.I. R3	5.15
Pawtucket,R.I.(21) N8	5.00
Riverdale,Ill. A1	4.50
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.85
SparrowsPoint,Md. B2	4.15
Trenton,N.J. R5	5.50
Wallingford,Conn. W2	5.35
Warren,O.(40) T5	4.75
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, (40)	4.50
Youngstown Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.80
Ecorse,Mich. G5	6.65
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W.Va. W6	6.45
Youngstown Y1	6.45

STRIP, Electro Galvanized

Dover,O. G6	5.00
Warren,O. T5	4.75
Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A.M. Byers Co.

C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

TIGHT COOPERAGE HOOP

Atlanta A11	3.80
Riverdale,Ill. A1	3.40
Sharon,Pa. S3	3.90
Youngstown C3	3.40

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill. (1) L1	5.90
Bartonville,Ill. (1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	6.20
Johnstown, Pa. B2	5.90
Los Angeles B3	6.85
Millbury,Mass.(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Williamsport,Pa. B2	6.00
Worcester A7,J4,T6,W12	6.20
Worcester,Mass. N6	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.70
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.70
Fostoria,O. S1	6.00
Kokomo, Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P16	5.35
Monessen,Pa. P7	5.60
Pawtucket,R.I.(12) N8	6.00
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.55
Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.85
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20, R2	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O. (24) S1	5.00
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.85
Los Angeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.75
Newark, 6-8ga. I-1	5.15
No.Tonawanda B11	4.50
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago, Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.80
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7	4.80
Worcester,Mass. T6	4.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
Los Angeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.15
Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

ROPE WIRE	Mfld Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.35	8.35	8.60
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P16	8.05	8.05	8.30
Monessen,Pa. P7	8.30	8.30	8.55
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquappa J5	5.35	5.80
Atlanta A11	5.70	5.95
Bartonville(1)K4	5.85	5.80
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.50
Crawfordsville M8	5.45	5.95
Donora A7	5.35	5.50
Duluth A7	5.85	5.50
Fairfield T2	5.85	5.50
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.80
Joliet,Ill. A7	5.35	5.50
KansasCy.Mo. S5	5.95	6.20
Kokomo C16	5.70	5.95
LosAngeles B3	6.30	...
Minnequa C10	5.60	6.10
Monessen P7	5.60	5.85
Palmer(31) W12	4.80	...
Pitts.Calif. C11	6.30	6.45
Prtsmth.(18)P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.85	5.60
So.S.Fran. C10	6.30	6.80
SparrowPt. B2	5.45	5.90
Sterling,Ill.(1)N15	5.65	5.85
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.80

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.50
Bartonville(1) K4	9.80	11.50
Cleveland A7	9.80	11.20
Crawfordsville M8	9.80	11.30
Fostoria,O. S1	10.40	12.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	12.05
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.55
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	126
Crawfordsville M8	135
Donora,Pa. A7	124
Duluth,Minn. A7	124
Fairfield,Ala. T2	124
Houston,Tex. S5	134
Johnstown,Pa. B2	130
Joliet,Ill. A7	124
KansasCity,Mo. S5	138
Kokomo,Ind C16	135
Minnequa,Colo. C10	136
Monessen,Pa. P7	133
Pittsburg,Calif. C11	144
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	124
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	151
SparrowsPoint,Md. B2	132
Sterling,Ill.(1) N15	133

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	125
Duluth A7	116
Franklin,Pa. F5	125
Huntington,W.Va. W7	125
Johnstown,Pa. B2	125
Joliet,Ill. A7	116
Marion,O. P11	125
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	*140*

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	120
Atlanta A11	123
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	123
Donora,Pa. A7	114
Duluth A7	114
Houston,Tex. S5	124
Fairfield,Ala. T2	114
Johnstown,Pa. B2	120
Johnstn,17ga.6" B2	194
Johnstn,17ga.,4" B2	197
Joliet,Ill. A7	114
KansasCity,Mo. S5	128
Kokomo,Ind. C16	123
Minnequa,Colo. C10	128
Monessen,Pa. P7	123
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	114
So.Chicago,Ill. R2	116
Sterling,Ill.(1) N15	118

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	113
Atlanta A11	119
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	120
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity, Mo. S5	125
Kokomo, Ind. C16	120
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	119

AXLES

Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. (13) J5	106
Atlanta A11	113
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	111
Crawfordsville,Ind. M8	112
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	112
Minnequa,Colo. C10	111
Monessen,Pa. P7	112
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	112
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.90
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.65
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	9.10
Pittsburgh O3, P14	9.10
Seattle B3	9.35

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	4.25

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Porthsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts.Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
S1 Senaca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield,S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn.Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Corp.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

TOOL STEELS

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50-31.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, T7, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base
(13) Add 0.50c for 17 Ga & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 14 gage.
(24) Deduct 0.20c for finer than 15 gage.
(25) Bar mill bands.
(26) Reinforcing, to fabricators (⅜" bar elec. furn. billet, 5.03c); to consumers, 5.28c.
(27) Bar mill sizes.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	33.5	4.0	2.0	4.0
¼	6.0	0.42	33.5	31.5	30.5	4.0	2.0	5.0
⅜	6.0	0.57	29.0	27.0	26.0	+1.5	+3.5	0.5
½	8.5	0.85	40.5	38.5	39.5	18.5	16.5	18.5
¾	11.5	1.13	43.5	41.5	42.5	22.5	20.5	21.5
1	17.0	1.68	46.0	44.0	45.0	26.0	24.0	25.0
1¼	23.0	2.28	46.5	44.5	45.5	26.5	24.5	25.5
1½	27.5	2.78	47.0	45.0	46.0	27.5	25.5	26.5
2	37.0	3.68	47.5	45.5	46.5	28.0	26.0	27.0
2½	58.5	5.82	48.0	46.0	47.0	28.5	26.5	27.5
3	76.5	7.62	48.0	46.0	47.0	28.5	26.5	27.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 points lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 43% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 34% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1.

Column D: Monaca, Pa. P9 quotes 1½ pts higher on ⅛" and ¼", 2 pts higher on ⅜", 1½ pts higher on ½" and ¾", 1 pt higher on 1" and 1¼", ½ pt higher on 1½" through 3"; Sharon, Pa. M6 quotes 1 pt lower on ⅛", 1½ pts higher on ¼", ½ pt higher on ⅜" and 1 pt lower on ½", ½ pt lower on ¾", 1½ pts lower on 1" and 1¼", 2 pts lower on 1½" through 3"; Butler, Pa. F6, ⅛" through ⅜"; Benwood, W. Va. W10 quotes 3 pts lower on ⅛", 2 pts lower on ¼", 3 pts lower on ⅜"; Wheatland, Pa. W9 quotes ½ pt lower on ⅛" and ¼", 2½ pts higher on ½" and ¾", 2 pts higher on 1" and 1¼", 1½ pts higher on 1½" through 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, plus 23% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5 quotes 1 pt lower on ¾", 2 pts lower on 1", 1½ pts lower on 1¼", 2 pts lower on 1½" and 2", 1½ pts lower on 2½" and 3"; Etna, Pa. N2 plus 23% on 3½" and 4". Fontana, Calif. K1 quotes 11 pts lower on ½" and larger continuous weld and 11% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	17.5	36.0	17.5
2½	58.5	5.82	39.0	20.5	39.0	20.5
3	76.5	7.62	39.0	20.5	39.0	20.5
3½	92.0	9.20	41.0	22.5	41.0	22.5
4	$1.09	10.89	41.0	22.5	41.0	22.5
5	1.48	14.81	41.0	22.5	41.0	22.5
6	1.92	19.18	41.0	22.5	41.0	22.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 3 pts lower on 2", 2½ pts lower on 2½-6 in.; Lorain, N3 quotes 1½ pts lower; Youngstown, Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.08	22.27	26.22
2½	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302	....	....	....	....	19.75	24.00	77.00
304	23.50	26.50–28.00	....	....	20.75–23.50	24.00–25.50	77.00
309	29.00	33.50	....	....	....	....	....
310	35.00	39.50	....	....	....	....	144.00
316	28.00	31.00–32.50	....	....	26.00	33.00–34.50	....
317	33.00	37.50	....	....	....	....	....
318	32.00	36.50	....	....	....	....	....
321	25.00	29.50	....	....	23.00	....	111.00
347	26.00	29.00–30.50	....	....	24.00	30.00–31.50	130.00
405	19.75	26.25	....	....	....	....	....
410	19.25	25.75	....	....	....	....	....
Nickel	31.00	41.00	33.50	45.00	....	....	....
Inconel	39.00	51.00	....	....	....	....	165.00
Monel	32.00	42.00	....	....	....	....	....
Copper*	....	....	21.70†	27.65‡	....	....	....

* Deoxidized. † 18.20c for hot-rolled. ‡ 24.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	23
⅝-in. & ⅞-in.	26
1-in. and larger	26
Longer than 6 in.:	
All diams.	22
Lag bolts, all diams.:	
6 in. and shorter	30
over 6 in. long	28
Ribbed Necked Carriage.	28
Blank	40
Plow	40
Step, Elevator, Tap, and Sleigh Shoe	28
Tire bolts	20
Boiler & Fitting-Up bolts	37

NUTS

	H.P. & C.P. Reg.	Heavy
Square:		
½-in. & smaller	23	23
⅝-in. & ⅞-in.	20	15
1-in.-1½-in.	23	10
1⅛ in. & larger	16	10
H.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in.	24	15
1-in.-1½-in.	20	11
1⅛ in. & larger	17	11
C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅞-in.	30	25
1-in. & 1½-in.	27	20
1⅛ in. & larger	20	15

SEMIFINISHED NUTS
American Standard
(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.
½-in. & smaller	35	41
⅝-in. & ⅞-in.	29	36
1-in.-1½-in.	23	31
1⅛-in. & larger	17	21
Light		
½-in. & smaller		41
⅝-in. to ⅞-in.		35
1-in. to 1½-in.		33

STEEL STOVE BOLTS
F.o.b. plant; per cent off list in packages)
Plain finish .....56 & 10
Plated finishes ....41 & 10

HEXAGON CAP SCREWS
(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	47
¾-in. through 1 in.	40
Longer than 6 in.:	
⅝-in. & smaller	33
¾-in. through 1 in.	13

SQUARE HEAD SET SCREWS
(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	44
1 in. and smaller diam. x over 6 in.	33

HEADLESS SET SCREWS
(Packaged; per cent off list)

No. 10 and smaller	41
¼-in. diam. & larger	24
N.F. thread, all diams.	18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
7/16-in. under .....43 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....List to 50c off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.00
8 to 16	48,60,72	17.00
7	48,60	18.64
6	48,60	19.95
4.5⅛	40	20.48
3	40	21.53
2½	24,30	22.05
2	24,30	24.15

CARBON

40	100,110	7.65
35	100,110	7.65
30	84,110	7.65
24	72 to 104	7.65
17 to 20	34,90	7.65
14	60,72	8.16
10,12	60	8.42

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	39.00	32.00	30.00
302	39.00	34.50	30.00
303	41.00	38.00	32.50
304	41.00	36.50	31.50
309	53.50	52.50	48.00
316	54.50	56.50	47.50
321	47.00	46.00	35.50
347	51.50	50.00	40.00
410	34.50	28.50	24.50
416	35.00	35.00	25.00
420	42.00	45.00	30.00
430	37.00	29.00	25.00
501	25.50	24.00	13.00
502	26.50	25.00	14.00

Baltimore, Types 301 through 347 sheet, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Types 303, 416, 501 & 502, S18.

Cleveland, strip A7.

Detroit, strip, except Types 303, 309, 321, 416, 420, 501 and 502 M1.

Dunkirk, N.Y., bars, wire A4.

Duquesne, Pa., bars C3.

Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Harrison, N. J., Types 302, 304, 316 wire and strip D6.

Massillon, all products R2.

McKeesport, Pa., bars, sheets except Type 416 C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip C4.

Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.

So. Chicago, Ill., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip, except Type 309 sheets 54.00c and bars 43.50c, J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 59.50c, strip 61.50c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-32.00
Toluol, one deg...21.00-28.00
Industrial xylol ..21.00-29.50
Per ton bulk, ovens
Sulphate of ammonia .$32-45
Cents per pound, ovens
Phenol, 40 (carlots, non returnable drums) ..17.25
Do., less than carlots..18.00
Do., tank cars 15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $41; less than 60%, $38.
Imported, net ton, duty paid, metallurgical grade, $28-$29.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge Iron	
98+% Fe, carlots	16.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed 99+% Fe (minus 325 mesh)	48.50
Powder Flakes	44.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.50
Atomized, 500 lb drums, freight allowed	32.50
Brass, 10-ton lots	30.00-33.25
Copper:	
Electrolytic	36.75
Reduced	33.75-37.00
Lead	23.00
Manganese:	
Minus 100-mesh	52.00
Minus 35 mesh	45.00
Minus 200 mesh	56.00
Nickel unannealed	75.50
Nickel-Silver, 10-ton lots	43.25
Silicon	34.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Tin	$1.575
Zinc, 10-ton lots	23.00-30.50

Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
over 1000 lb	2.60
1000 lb	2.85
less than 1000 lb	3.00
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	3.65
less than 1000 lb	3.75

Molybdenum:	Cents
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll. fur.	$14.00-14.50
Connellsvll. fdry.	16.00-17.00
New River, foundry	19.00
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.75
Everett, Mass., ovens New England, del.	24.30
Chicago, ovens	21.00
Chicago del.	22.45
Detroit, del.	24.91
Terre Haute, ovens	22.50
Milwaukee, ovens	23.00
Indianapolis, ovens	22.00
Chicago, del.	25.97
Cincinnati, del.	24.62
Detroit, del.	25.90
Ironton, O., ovens	21.50
Cincinnati, del.	24.06
Painesville, O., ovens	23.25
Buffalo, del.	26.37
Cleveland, del.	24.97
Erie, Pa., ovens	22.50
Birmingham, ovens	19.00
Birmingham, del.	20.45
Philadelphia, ovens	22.10
Nevillelsland, Pa., ovens	22.00
Swedeland, Pa., ovens	22.00
St. Louis, ovens	22.00
St. Louis, del.	24.12
Portsmouth, O., ovens	21.50
Cincinnati, del.	24.06
Detroit, ovens	23.00
Detroit, del.	24.00
Buffalo, del.	26.04
Flint, del.	25.44
Pontiac, del.	24.39
Saginaw, del.	25.75

Includes representative switching charge of *, $1.00; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.82	6.84	7.84	6.14	...	5.97	6.64	8.60	5.95	6.18	7.64
New York (c'try)	5.52	6.64	7.54	5.84	...	5.67	6.34	8.70	5.65	5.88	7.34
Boston (city)	5.95	6.75	7.89	5.90	...	5.80	6.39	8.70	5.95	6.58	7.48
Boston (c'try)	5.75	6.55	7.69	5.70	...	5.60	6.19	8.50	5.75	6.38	7.28
Phila. (city)	6.60-6.70	6.75	7.20	5.90	...	5.85	6.46	8.40	5.70	5.90	7.00
Phila. (c'try)	6.35-6.45	6.50	6.95	5.65	...	5.60	6.21	8.15	5.45	5.65	6.75
Balt. (city)	5.35	6.59	6.77	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try)	5.15	6.39	6.57	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va.	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Richmond, Va.	5.55	...	6.80	5.83	...	5.73	6.30	...	5.83	5.65	7.33
Wash. (w'hse)	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††§	5.55	5.85	7.15
Buffalo (w'hse)	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††§	5.35	5.65	6.95
Pitts. (w'hse)	5.15	5.95*	6.70-6.95	5.20	6.15	5.10	5.75	9.55††	5.25	5.35	6.60
Detroit (w'hse)	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††§	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.50	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse)	5.15	5.95	7.30	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city)	5.57	6.14	6.54	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city)	5.35	6.15	7.15	5.30	...	5.30	5.85	9.75††§	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.95	5.10	...	5.10	5.65	9.65††§	5.25	5.40	6.60
Milwaukee (city)	5.49	6.29	7.29	5.44	...	5.44	6.09	9.89††§	5.59	5.74	6.94
Milwau. (c'try)	5.29	6.09	7.09	5.24	...	5.24	5.89	9.69††§	5.39	5.54	6.74
St. Louis (del.)	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††§	5.78	5.93	7.13
St. L. (w'hse)	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††§	5.58	5.73	6.98
Kans. City (city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity (w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr.	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.30	6.10	6.30[2]	5.25	...	5.25	6.88	...	5.40	5.70	7.88
Birm'hm (w'hse)	5.15	5.95	6.15[3]	5.10	...	5.10	...	...	5.25	5.55	...
Los Ang. (city)	6.10	7.65	7.90	6.15	8.90	6.10	7.75	...	6.10	6.20	8.40
L. A. (w'hse)	5.90	7.45	7.70	5.95	8.70	5.90	7.55	...	5.90	6.00	8.20
San Francisco	6.50[9]	7.60[9]	7.50[2]	7.45[9]	8.25[2]	6.30[9]	7.55	...	6.30[9]	6.40[9]	8.50[9]
Seattle-Tacoma	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—460 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [9]—400 to 9999 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa. $99.60; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, O., Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

MALLEABLE BUNG BRICK

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

SILICA BRICK

Mt. Union, Clayesburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

BASIC BRICK

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73; chemical-bonded chrome brick, $77; magnesite brick, $99; chemical-bonded magnesite, $88.

MAGNESITE

Per net ton, Chewelah, Wash. Domestic dead-burned, ⅝" grains; bulk, $36.30; single paper bags, $41.80.

DOLOMITE

Per net ton. Domestic, burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Nario, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Net ton unit, duty paid

Chinese	$36.00
Brazilian	36.00
Bolivian	36.00
Domestic scheelite, del.	36.00

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	*$19.50*
45% no ratio	*20.00*
48% no ratio	*27.00*
50% no ratio	*28.00-28.50*
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $70, Palmerton, Pa.; $71, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l., packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., Welland, Ont., or Ashtabula, O. Base price: $174, f.o.b. Birmingham; $187, Johnstown, Pa.; $185, Sheridan, Pa.; $175, Etna, Pa.; $190, Chattanooga, Tenn. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lot 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max, 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 29.75c; ton lot 31.25c; less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65 - 68%), Contract, lump bulk, 1.50% C grade, 18-20% Si 9.60c per lb of alloy; carload packed, 10.35c, ton lot 11.25c, less ton 12.25c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%,

(*Please turn to page* 115)

Metal Shortage Intensifying

Consumer Goods manufacturers anticipate sharp curtailment in production schedules as soon as provisions in aluminum and other NPA metal orders become effective

New York—Shortages of aluminum, copper, zinc and some of the other major nonferrous metals are more serious than the stringency in steel. These shortages, combined with curtailments enforced in some instances by provisions of National Production Authority orders, will cause a drop in production schedules at many metal consuming plants as soon as the orders become effective. The curtailment in aluminum shipments, for instance, indicates that some manufacturers will be forced to curtail production almost immediately.

It is pointed out that supplies of major nonferrous metals have been tight for several months, preventing consumers from building up reserve stocks. Production schedules generally are geared to the week-to-week receipts of those metals.

The government's curb on civilian use of aluminum will be particularly severe on producers using that metal for awnings, windows, screens, sash and fencing. Other nonferrous metal orders will result in cutbacks in production of many durable consumer products, including automobiles, electrical appliances, radios, television sets, washing machines, vacuum cleaners, etc. Manufacturers are preparing to allocate their civilian products among their dealer outlets when the curbs force them to restrict output of such items.

The full force of the curtailment orders will be cushioned in those instances where the producers are able to supplement their civilian goods operations with government work.

Zinc — Several large galvanizers have curtailed operations due to the shortage of zinc. H. W. Johnson, vice president in charge of steel production, Inland Steel Co., said last week: "Zinc stocks are so low that galvanizing operations must be geared to receipts of the metal with cuts varying but reaching as much as 50 per cent of capacity operation." He said the shortage of zinc is "aggravated by the government's stockpiling" program.

While the producers' market is unchanged on the basis of 17.50c. E. St. Louis, zinc for future delivery on Commodity Exchange continues to rise steadily, ranging up to 26.00c for December delivery.

Copper—NPA is considering an order which would allocate copper supplies after defense requirements are met. The proposed order would provide for a cutback of 30 to 35 per cent in the base period use of copper by brass and wire mills. Supplies on the open market continue extremely tight, but producers continue to quote electrolytic, on the basis of 24.50c, delivered Connecticut Valley.

Tin—Trade reports here indicate that efforts to effect an international tin agreement under the auspices of the United Nations has ended in failure following the conferences which were held in Geneva, Switzerland. Consumers are still reluctant to pay prevailing prices which are fluctuating around 37.00c a pound.

Lead—Demand for lead continues active, but due to increasing tightness in supplies actual bookings are restricted. At least one large seller is allocating lead for December delivery. Demand is well diversified with battery makers especially active. For the first time on record, monthly shipments of automotive replacement batteries exceeded 3 million units when a total of 3,019,000 batteries were shipped in October. This compares with 2,925,000 units in September and 2,573,000 in October, 1949. Total shipments for the first ten months of this year amounted to 18,432,000 units, or more than 3,916,000 units more than in the comparable period last year.

Remelt Aluminum—Secondary aluminum ingot prices are rising gradually, as they have been in the last five months. This advance is attributed to increased demand, coupled with the steady uptrend in scrap prices. No. 1 aluminum ingot, grade 2, is quoted 30.50c to 31.00c a pound, while piston alloys are quoted 31.00c to 32.00c.

Aluminum Stockpile Goal Raised

Washington—A goal of 1500 million additional pounds of primary aluminum for the national stockpile has been established. The government will attempt to obtain 200 million pounds by the middle of next year, 100 million pounds in the second half of 1951, and 300 million pounds annually in the 1952-1955 period.

Supplies for the stockpile will be made available by restricting consumption of the metal in consumer goods, by reactivating idle facilities and through a large domestic expansion program expected to be announced soon. The General Services Administration is negotiating with the Aluminum Co. of America to reactivate the company's facilities at Massena, N. Y., and Badin, N. C. These plants will be able to deliver 158 million pounds of primary aluminum annually when operating at capacity. It will require six months before peak production can be achieved. If the stockpiling goal is to be reached, the government will have to obtain from other sources 190 million pounds in 1951 and 142 million pounds in each of the four succeeding years.

Turkey May Reopen Lead Mines

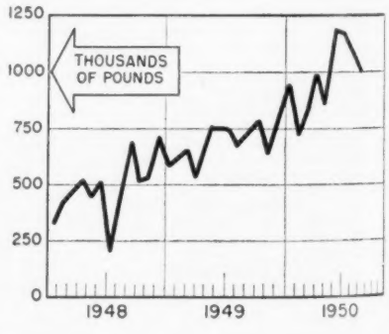
Washington—Turkey may reopen lead mines which have been idle about 1350 years. The project is being worked out under the Marshall Plan, one objective of which is to make Turkey as nearly self-sufficient as possible in the production of lead, conserving valuable foreign exchange for the purchase of other products which Turkey cannot produce herself.

Under the technical assistance program of the Economic Cooperation Administration, an American consulting engineer is en route to Turkey to help determine the advisability of reopening the mines and constructing a smelter plant to process the ores. This engineer, Ronald C. Rutherford, has a four-months contract with the Turkish government. He will study the possibilities of direct smelting the high-arsenic low-lead, gold and silver ores of the Bolkardag mine, and the lead ores of the Keban mine. Mr. Rutherford was associated with the American Smelting & Refining Co. from 1918 until this year.

If the project should prove feasible, it would be of great economic importance to Turkey which now imports all of her lead requirements. A smelter would lead to development of additional mines, providing the country with an exportable surplus of lead and profits from the related minerals and precious ores, proponents of the project believe. Turkish records indicate substantial lead, gold and silver ores are available.

Magnesium Product Shipments

Washington — Shipments of magnesium wrought products, on an average working-day basis, increased 5 per cent in September over August and 47 per cent over September, 1949, reports the Census Bureau. Net shipments, unadjusted for the number of working days, were 1,011,000 pounds in September compared with 1,103,000 pounds in August and 724,000 pounds in September, 1949. Total shipments for the first nine months



came to 8,918,000 pounds compared with 6,077,000 pounds in the like period a year ago.

September shipments of aluminum wrought products, on an average working-day basis, were 13 per cent above August and 81 per cent over the September, 1949, figure. Net shipments amounted to 166 million pounds in September compared with 169 million pounds in August and 96 million pounds in September, 1949. Cumulative total for the first nine months is 1,224,011,000 pounds compared wtih 878,110,000 pounds in the like period a year ago.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.
Brass Ingot: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.
Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.60c, delivered.
Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.
Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.
Secondary Aluminum: Piston alloys 31.00-32.00c; No. 12 foundry alloy (No. 2 grade) 30.50-31.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 32.50-33.00c; grade 2, 30.75-31.50c; grade 3, 30.00-30.50c; grade 4, 29.50-30.00c. Prices include freight at c.l. rate up to 75 cents per 100 lb.
Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.
Tin: Grade A, spot, prompt, nom.; Dec. nom..; Jan. nom.; Feb. nom.
Antimony: American 99-99.8% and over but not meeting specifications below 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 32.50c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%; Chinese 34.00c; English, 32.75c; Belgian, 32.75c, duty paid, New York.
Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.
Mercury: Open market, spot, New York, $107-$110, nominal, per 76-lb flask.
Beryllium-Copper: 3.75-4.25% Be, $30.00 per lb contained Be, f.o.b., Reading, Pa.
Cadmium: "Regular" straight or flat forms, $2.40 del.; special or patented shapes $2.65.
Cobalt: 97-99%, $1.80 per lb for 500 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.
Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York 80.00c per oz.
Platinum: $90-$93 per ounce from refineries.
Palladium: $24 per troy ounce.
Iridium: $200 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)
Sheet: Copper 39.93-41.68; yellow brass 36.86-38.28; commercial bronze, 95%, 39.91-41.61; 90%, 39.48-41.13; red brass, 85%, 38.54-40.14; 80%, 38.12-39.67; best quality, 39.15; nickel silver, 18%, 50.57-51.91; phosphor-bronze grade A, 5%, 58.49-60.20.
Rods: Copper, hot-rolled 35.78-37.53; cold-drawn 37.03-38.78; yellow brass free cutting, 31.26-32.63; commercial bronze, 95%, 39.60-41.30; 90%, 39.17-40.82; red brass 85%, 38.23-39.83; 80%, 37.81-39.36.
Seamless Tubing: Copper 39.97-41.72; yellow brass 39.87-41.29; commercial bronze, 90%, 42.14-43.79; red brass, 85%, 41.45-43.05; 80%, 42.58.
Wire: Yellow brass 37.15-38.57; commercial bronze, 95%, 40.20; 90%, 39.77-41.42; red brass, 85%, 38.83-40.43; 80%, 38.41-39.96; best quality brass, 39.44.
Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-29.42, l.c.l. 29.17-29.92, 100,000 lb lots 28.545-29.295; weatherproof, f.o.b. eastern mills, c.l. 29.60, l.c.l. 30.10, 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)
Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 23.50-23.75c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 22.50-23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.00c; over 12-in., 23.50-24.00.

"A" NICKEL

(Base prices f.o.b. mill)
Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 77.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b. mill)
Sheets, cold-rolled 53.00c. Strip cold-rolled 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb. 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.
Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 36.59-38.34c; oval 36.09-37.84c; cast 37.37c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 55.6c, under 1000 lb 57.6c, f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,000 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 19.25c; over 200 lb 28.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 65.00c; 10,000 to 30,000 lb, 63.00c; 3000 to 10,000 lb, 67.00c, 500 to 3000 lb, 68.00c; 100 to 500 lb, 70.00c; under 100 lb, 73.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 33.50c; 400-lb bbl, 31.50c up to 10,000 lb, 31.00c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300 lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums 45.7c, f.o.b. Niagara Falls, N. Y.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.00	23.00	22.25
Yellow Brass	20.125	19.875	18.75
Commercial Bronze			
95%	21.875	21.625	21.125
90%	21.75	21.50	21.00
Red brass			
85%	21.50	21.25	20.75
80%	21.375	21.125	20.625
Muntz metal	19.00	18.75	18.25
Nickel, silver, 10%	22.25	22.00	11.125
Phos. bronze, A	24.00	23.75	22.75

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)
No. 1 copper 26.00; No. 2 copper 25.00; light copper 24.00; composition red brass 22.00-22.75; radiators 17.75; heavy yellow brass 17.50-18.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)
No. 1 copper 26.00*; No. 2 copper 25.00*; light copper 24.00*; refinery brass (60% copper) per dry copper content 21.00.

* Nominal

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)
Copper and brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 22.50-23.00; light copper 21.00-21.50; No. 1 composition red brass 18.75-19.00; No. 1 composition turnings 18.25-18.50; mixed brass turnings 13.00-13.50; new brass clippings 18.50-19.00; No. 1 brass rod turnings 17.00-17.50; light brass 11.75-12.00; clean heavy yellow brass 15.00; new brass rod ends 17.50-18.00; auto radiators 15.25-15.50; cocks and faucets, 16.75-17.00; brass pipe 17.75-18.00.
Lead: Heavy 14.50-14.75; battery plates 8.75-9.00; linotype and stereotype 14.50-14.75; electrotype 12.75-13.00; mixed babbitt 12.25-12.50.
Zinc: Old zinc 11.00-11.25; new die cast scrap 10.75-11.00; old die cast scrap 8.00-8.25.
Tin: No. 1 pewter 63.00-65.00; block tin pipe 90.00; No. 1 babbitt 58.00-60.00.
Aluminum: Clippings 2S 18.50; old sheets 14.00-15.00; crankcase 15.00; borings and turnings 12.00-12.50.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. 21-22	24.50	16.80	17.50	nom.	19.00	32.00	48.00	80.00
Nov. 20	24.50	16.80	17.50	137.00	19.00	32.00	48.00	80.00
Nov. 16-18	24.50	16.80	17.50	132.00	19.00	32.00	48.00	80.00
Nov. 15	24.50	16.80	17.50	136.00	19.00	32.00	48.00	80.00
Nov. 14	24.50	16.80	17.50	137.50	19.00	32.00	48.00	80.00
Nov. 13	24.50	16.80	17.50	138.00	19.00	32.00	48.00	80.00
Nov. 10	24.50	16.80	17.50	130.00	19.00	32.00	48.00	80.00
Nov. 9	24.50	16.80	17.50	138.00	19.00	32.00	48.00	80.00
Nov. 8	24.50	16.80	17.50	155.00	19.00	32.00	48.00	80.00
Nov. 7	24.50	16.80	17.50	152.00	19.00	32.00	48.00	80.00
Nov. 6	24.50	16.80	17.50	151.00	19.00	32.00	48.00	80.00
Nov. 3-4	24.50	16.80	17.50	136.00	19.00	32.00	48.00	80.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Nov. 22, 1950; gross tons
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Nov. 22	$41.00
Nov. 16	41.67
Oct. 1950	41.37
Nov. 1949	28.96
Nov. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	$44.00
No. 2 Heavy Melt.	41.00
No. 1 Busheling	44.00
No. 1 Bundles	46.50
No. 2 Bundles	39.00
Heavy Turnings	45.00-46.00
Machine Shop Turnings	36.00-36.50†
Mixed Borings, Turnings	36.00-36.50†
Short Shovel Turnings.	38.00
Cast Iron Borings	36.00-37.00
Low Phos. Steel	53.50-54.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-56.00
No. 1 Machinery Cast	*60.00-61.00*
Charging Box Cast	54.00-55.00
Heavy Breakable Cast.	53.00-54.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.00
Rails, Random Lengths	63.50-64.00
Rails, 2 ft and under	66.50-67.50
Rails, 18 in. and under	67.50-68.50
Railroad Specialties	61.00-62.00

† Crushers' buying prices.

CLEVELAND

(*Delivered Consuming Plant*)

No. 1 Heavy Melt. Steel	$43.00-43.50
No. 2 Heavy Melt. Steel	39.00-39.50
No. 1 Busheling	42.50-43.00
No. 1 Bundles	42.50-43.00
No. 2 Bundles	31.00-31.50
Machine Shop Turnings	35.00-35.50
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.50-37.00
Low Phos.	46.00-46.50

Cast Iron Grades

No. 1 Cupola	64.00-65.00
Charging Box Cast	52.00-53.00
Stove Plate	54.00-55.00
Heavy Breakable Cast	54.00-55.00
Unstripped Motor Blocks	43.00-44.00
Brake Shoes	49.00-50.00
Clean Auto Cast	64.00-65.00
Burnt Cast	45.00-46.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.00
R.R. Malleable	69.00-70.00
Rails, 3 ft and under	69.00-70.00
Rails, 18 in. and under	70.00-71.00
Rails, Random Lengths	64.00-65.00
Cast Steel	54.00-55.00
Railroad Specialties	57.00-58.00
Uncut Tires	59.00-60.00
Angles, Splice Bars	64.00-65.00

VALLEY

No. 1 Heavy Melt. Steel	$43.50-44.00†
No. 2 Heavy Melt. Steel	39.50-40.00†
No. 1 Bundles	43.50-44.00†
Facty. Prod. Bundles	43.50-44.00†
No. 2 Bundles	34.00-34.50
Machine Shop Turnings	35.00-35.50
Short Shovel Turnings.	37.00-37.50
Cast Iron Borings	37.00-37.50
Low Phos.	46.00-46.50†

† Plus applicable springboards

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$39.00*
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	38.00
No. 1 Bundles	39.00-43.00
No. 2 Bundles	32.00
Short Shovel Turnings.	33.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	26.00-27.00
Low Phos. Punchings and Plate, elec. fur. grade	49.00-50.00
Low Phos. Plate, 5 ft & Under	48.00-49.00
Elec. Furnace Bundles.	46.00
Heavy Turnings	39.00
No. 1 Chemical Borings.	*42.00*
Knuckles and couplers.	53.00-53.50
Steel car wheels	53.00-53.50

Cast Iron Grades

No. 2 Cupola Cast	52.00
No. 1 Machinery Cast	*56.00-57.00*
No. 1 Yard Cast	49.00-50.00
Charging Box Cast	50.00-51.00
Heavy Breakable Cast.	49.00-50.00
No. 1 Wheels	*64.00*
Malleable	65.00-67.00

CINCINNATI

No. 1 Heavy Melt. Steel	$43.50
No. 2 Heavy Melt. Steel	40.50
No. 1 Busheling	43.50
No. 1 Bundles	43.50
No. 1 Black Bundles	40.50
No. 3 Bundles	30.00
Machine Shop Turnings	29.00
Short Shovel Turnings.	31.00
Mixed Borings, Turnings	30.00
Cast Iron Borings	31.00

Cast Iron Grades

No. 1 Cupola Cast	65.00
Charging Box Cast	55.00
Stove Plate	50.00
Heavy Breakable Cast.	52.00
Unstripped Motor Blocks	40.00
Brake Shoes	34.00
Clean Auto Cast	65.00
Drop Broken Cast	67.00
Low Phos., 18 in. and under	56.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.00
R.R. Malleable	60.00
Rails, Rerolling	63.00
Rails, Random Lengths	63.00
Rails, 18 in. and under	70.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$32.50-36.00
No. 1 Bundles	*37.50-43.00*
No. 2 Bundles	*32.50-33.50*
No. 1 Busheling	*37.50-43.00*
Machine Shop Turnings	29.00-29.50
Forge Flashings	37.50-39.50
Short Shovel Turnings.	31.50-34.50
Cast Iron Borings	34.00-35.00
Punchings & Plate Scrap	41.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	*59.00-61.00*
Heavy Breakable Cast	*48.00-51.50*
Clean Auto Cast	*62.00-64.00*

BUFFALO

No. 1 Heavy Melt. Steel	$41.00-42.00
No. 2 Heavy Melt. Steel	38.00-38.50
No. 1 Busheling	38.00-38.50
No. 1 Bundles	39.50-40.00
No. 2 Bundles	36.00-36.50
Machine Shop Turnings	31.50-32.50
Mixed Borings, Turnings	35.00-36.00
Cast Iron Borings	35.00-36.00
Short Shovelings	35.00-36.00
Low Phos.	47.00-48.00

Cast Iron Grades

No. 1 Cupola	49.00-50.00
No. 1 Machinery	52.00-54.00
Malleable	58.00-60.00

Railroad Scrap

Rails, 2 ft and under.	60.00-61.00
Rails, random size	53.00-54.00
Railroad Specialties	53.00-53.50

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$34.50*
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	32.00-33.00
No. 1 Bundles	34.50*
No. 2 Bundles	28.00-29.00
Mixed Borings, Turnings	25.00-25.50
Machine Shop Turnings	25.00-25.50
Short Shovel Turnings.	26.00-27.00
Punchings & Plate Scrap	39.00-40.00
Low Phos. Plate, 5 ft & under	39.00-40.00
Elec. Furnace Bundles.	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
No. 1 Machinery	45.00-46.00
Charging Box Cast	40.00-41.00
Heavy Breakable	40.00-41.00
Unstripped Motor Blocks	38.00-39.00

* Nominal

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$32.50-33.00
No. 2 Heavy Melt. Steel	29.00-29.50
No. 1 Bundles	32.50-33.00
No. 1 Busheling	*29.00-29.50*
Machine Shop Turnings	25.00
Short Shovel Turnings.	26.00-26.50
Mixed Borings, Turnings	25.50-26.50
Bar Crops and Plate	40.00-42.00
Punchings & Plate Scrap	40.00-42.00
Chemical Borings	*30.00-31.00*

Cast Iron Grades

No. 1 Cupola Cast	41.00-42.00
Mixed Cast	39.00-40.00
Heavy Breakable Cast.	38.50-39.50
Stove Plate	*38.00-39.00*

CHICAGO

No. 1 Heavy Melt. Steel	$40.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Bundles	40.00
No. 2 Bundles	35.00
Machine Shop Turnings	34.00
Mixed Borings, Turnings	34.00
Short Shovel Turnings	*35.00-36.00*
Cast Iron Borings	*35.00-36.00*
Low Phos.	51.00-53.00
Elec. Furnace Bundles	*43.00-44.00*
Heavy Turnings	38.00-39.00
Cut Structurals	47.00-48.00

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Clean Auto Cast	58.00-60.00
No. 1 Wheels	*57.00-58.00*
Stove Plate	*44.50-45.50*

Railroad Scrap

No. 1 R.R. Heavy Melt.	46.00-47.00*
Malleable	66.00-67.00
Rails, Rerolling	64.00-65.00
Rails, Random Lengths	59.00-60.00
Rails, 2 ft. and under.	64.00-66.00
Rails, 18 in. and under	66.00-67.00
Railroad Specialties	*57.00-58.00*
Angles, Splice Bars	*61.00-62.00*

*Brokers' buying price.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$38.00-40.00
No. 2 Heavy Melt. Steel	34.00-35.00
No. 1 Busheling	*36.00-37.00*
No. 2 Bundles	35.50
Machine Shop Turnings	30.00
Mixed Borings, Turnings	28.00
Short Shovel Turnings.	34.00
Cast Iron Borings	28.00
Bar Crops and Plate	44.00-45.00
Cut Structurals	44.00

Cast Iron Grades

No. 1 Cupola Cast	54.00
Stove Plate	47.00-48.00
No. 1 Wheels	nominal

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-41.00
R.R. Malleable	nominal
Rails, Rerolling	58.00-59.00
Rails, 2 ft and under	59.00-60.00
Angles and Splice Bars	*58.00-59.00*

ST. LOUIS

No. 1 Heavy Melt. Steel	$42.00-44.00
No. 2 Heavy Melt. Steel	36.50-37.50
No. 1 Bundles	41.00-42.00
No. 2 Bundles	36.00-37.00
Machine Shop Turnings	30.00-31.00
Short Shovel Turnings.	32.00-33.00

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Charging Box Cast	46.00-48.00
Heavy Breakable Cast.	47.00-48.00
Brake Shoes	48.00-50.00
Clean Auto Cast	60.00-62.00
Burnt Cast	46.00-47.00

Railroad Scrap

R.R. Malleable	64.00-66.00
Rails, Rerolling	60.00-61.00
Rails, Random Lengths	58.00-60.00
Rails, 2 ft and under	61.00-63.00
Uncut Tires	53.00-54.00
Angles, Splice Bars	60.00-62.00
Railroad Specialties	55.00-57.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$26.50
No. 2 Heavy Melt. Steel	24.50
No. 1 Bundles	26.50
No. 2 Bundles	22.50
No. 3 Bundles	19.50
Machine Shop Turnings	13.00
Low phos. electric	40.00

Cast Iron Grades

No. 1 Cupola Cast	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	26.50
Rails, Random Lengths	26.50

SEATTLE

No. 1 Heavy Melt. Steel	$28.00
No. 2 Heavy Melt. Steel	28.00
No. 1 Busheling	25.50-26.00
Nos. 1 & 2 Bundles	25.50-26.00
No. 3 Bundles	22.00
Machine Shop Turnings	20.00
Mixed Borings, Turnings	20.00
Punchings & Plate Scrap	37.50-38.00
Cut Structurals	37.50-38.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-42.00
Heavy Breakable Cast.	35.00
Stove Plate	35.00
Unstripped Motor Blocks	33.00-35.00
Malleable	33.00-35.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.00
Railroad Malleable	35.00
Rails, Random Lengths	29.00-30.00
Angles and Splice Bars	29.00-30.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$26.50
No. 2 Heavy Melt. Steel	24.50
No. 1 Bundles	26.50
No. 2 Bundles	22.50
No. 3 Bundles	17.50
Machine Shop Turnings	13.00
Punchings & Plate Scrap	40.00

Cast Iron Grades

No. 1 Cupola Cast	49.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	nominal
Rails, Rerolling	39.50

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$30.00
No. 1 Bundles	30.00
Mechanical Bundles	28.00
Mixed Steel Scrap	28.00
Mixed Borings, Turnings	23.00
Rails, Remelting	30.00
Rails, Rerolling	33.00
Busheling	24.50
Bushelings new factory, prep'd	28.00
Bushelings new factory, unprep'd	23.00
Short Steel Turnings	23.00

Cast Iron Grades*

No. 1 Machinery Cast.	45.00

* F.o.b. shipping point.

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Sheets, Strip . . .

Sheet and Strip Prices, Page 95 & 96

Cleveland — Sharp curtailment in civilian goods manufacturing operations are anticipated next quarter as result of cutbacks in steel quotas to permit diversion of tonnage into defense and related channels. While procurement of sheets and strip has been increasingly difficult over recent months most civilian goods manufacturers have been able to get in enough material to keep their shops going at top speed. To do this, however, they have been compelled to purchase steel in the gray market and many of them have taken in foreign material. For the most part buyers have steered clear of the gray market where cold-rolled sheets are being offered at 18 cents per pound, but with the shortages of supplies beginning to force operations curtailments it will not be surprising if activity in this market picks up noticeably, regardless of price. Some buyers report that surprisingly large tonnage appears to be available from gray market operators.

Pittsburgh—Yearend carryover on sheets and strip is expected to range between four and six weeks with hot-rolled items constituting the largest unfilled commitments. Most consumers prefer to leave their carryover tonnage on mill books rather than accept the option of respecifying against reduced allotments.

Most DO orders accepted to date involve hot-rolled sheets due to heavy tonnage specifications for landing mats, drums, etc. Sellers are booked into March on rated hot-rolled sheet tonnage, and through most of February on cold-rolled. Silicon grades are booked through March on DO orders, while openings are reported in late February and March for galvanized and enameling grades.

New York — Most sheet producers have laid aside tonnage for DO requirements and car work for the first quarter. However, they have accepted nothing beyond January for non-rated requirements. That is even true in certain instances with regard to stainless steel and alloy specialties. Producers say preference work is definitely expanding and hesitate to make any predictions as to how much non-rated work they may be able to produce in first quarter. However, some are of the opinion that cutbacks will not be as heavy as now reported unless the country gets into all-out war.

Cincinnati—Sheet mills foresee a greater proportion of tonnage going on DO orders and directive needs in February. Although little room was found in January schedules for new ordering for nonmilitary requirements, a large proportion represented carryover for civilian end-use. Equipment is being kept on normal rolling, not yet diverted to heavier products as was done on some mills during World War II.

Chicago—In the face of declining supplies of sheets and strip, users are forced to match fabricating operations more closely with receipts. Inventories are disappearing, hastening the time of more drastic curtailments. Unable to obtain sufficient steel, some fabricators of products for others are relinquishing contracts. Inland Steel Co., which a week ago dropped production of galvanized sheets 25 per cent because of zinc shortage, has since extended the cut up to 50 per cent to gear galvanizing operations with receipts of zinc. Government stockpiling of zinc is aggravating the situation.

Brimingham—Sheet users continue their loud chorus of "more" and still "more". But steel mills are in a quandary. There are no more sheets for anybody. Mills report a steady increase in DO orders.

Steel Bars . . .

Bar Prices, Page 95

New York—Some sellers of hot carbon as well as cold carbon bars have accepted non-rated orders for shipment beyond January. They admit they may have to revise schedules as the 45-day lead time approaches, but believe they can give their regular customers something to count on without being too far off in their estimates. On the other hand, other mills, some for the first time, are going ahead strictly on a month-to-month basis, making no commitments whatsoever in advance—at least insofar as non-rated requirements are concerned.

Pittsburgh — Some producers are booked through March on open hearth alloy bar DO tonnage. Rated alloy bar tonnage, both electric furnace and open hearth, has been heavier than expected, notably for rocket motor tubes, tanks and aircraft. There appears to be preference for large alloy rounds in rated orders booked to date. Petroleum interests will have to take a substantial reduction in allotments since their steel requirements have not yet been established on a preferred basis by NPA.

Cleveland—The shortage of steel bars is extremely acute. Some manufacturers report supply conditions in this product even more serious than in sheets and strip, for many months the chief scarcity. Producers are booked up through January and are not yet accepting orders from the general trade for February. DO and other emergency rated tonnage and heavy carryover from December will absorb most of the mills' bar production in January.

Chicago — Retail sales of farm equipment are on a level above a year ago and demand is holding strong. Since agricultural equipment constitutes an important use of bars, as well as other steel products, and since growing shortage of materials operates to hold production down, it is expected the industry will seek government aid in steel supply at not too distant a date.

Seattle—Rolling mills continue at peak capacity. While demand for small tonnages of bars has declined seasonally, the volume is above normal. Jobbers are actively buying merchant bars, replacing stock, but the bulk of local output is reinforcing, most of it for public works. Prices are unchanged, although some producers have protected themselves on future contracts in anticipation of higher prices which are expected within two weeks.

Tin Plate Price Increased

Pittsburgh—New method for quoting tin plate prices was announced last week by the Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, in announcing contract prices for 1951 on tin mill products.

The new procedure establishes a price base at each producing mill of the company and establishes revised extras and deductions for each of the different classifications of tin mill products.

This is the first major change in the method of pricing tin mill products since the industry started production of these products in the United States many years ago. It is designed to reflect more realistically the technological developments in the industry in recent years.

The new prices for base box, 100-lb. basis weight, f.o.b. producing point are as follows: Common coke tin plate (1.25-lb. pot yield) $8.45; electrolytic tin plate (0.25-lb coating) $7.15; black plate $6.25; special coated manufacturing ternes $7.50; eight pound manufacturing ternes $9.50.

Announcement of these prices, which are applicable for the entire year of 1951, is being made at an earlier date than has been customary apparently because of the major changes in the method of pricing.

While the new pricing method does not provide an exact basis for direct comparison with Carnegie-Illinois' present prices, the company stated that the new prices reflect an average increase of approximately 12 per cent. This increase takes into account the substantial rise in production costs as current prices on tin mill products were announced about a year ago. Among cost increases have been a sharp rise in price of pig tin during the past few months. Pig tin is up 85.8 per cent since Jan. 1, current tin plate prices being based on 77½ cents per lb. tin. Today tin is $1.44 per lb. Palm oil is up 61.9 per cent. The present price is 17 cents compared to 10½ cents Jan. 1st last. Iron and steel scrap is up 47.9 per cent. In Pittsburgh for example, the price is $44 for No. 1 steel against $29.75. The increase in prices also takes into effect the probable increase in wages for next year.

Tin mill product prices for 1951 by other U. S. Steel subsidiaries are: Tennessee Coal, Iron & Railroad Co.: Coke tin plate $8.55; electrolytic $7.25; black plate $6.35; special coated manufacturing ternes $7.60.

Columbia Steel Co.: Coke tin plate $9 20; electrolytic $7.90; black plate $7.00.

Tubular Goods . . .

Tubular Goods Prices, Page 98

Chicago — Despite zinc shortage which is growing progressively worse, producers of pipe and tubing here are maintaining output well. One mill which recently put some cutbacks into effect now finds its zinc supply situation improved. Another, which reports its position tight, has fully maintained schedules.

Seattle—Cast iron pipe demand is slow and no large projects are up for figures. Buyers are awaiting delivery of current contracts before planning future business.

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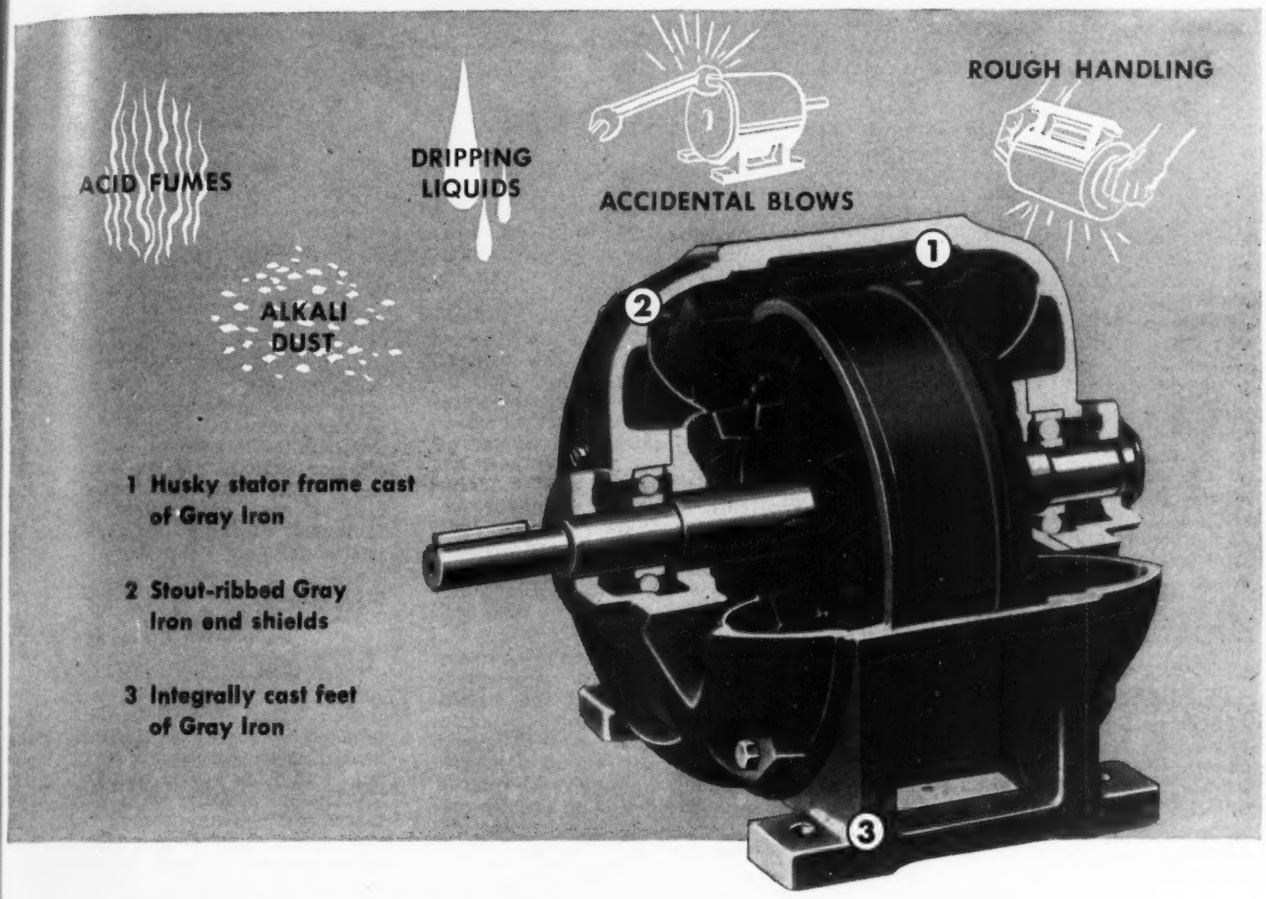

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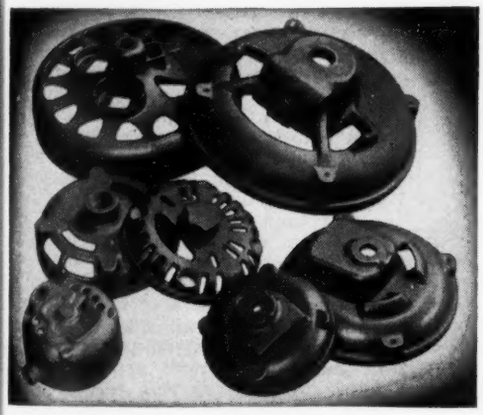

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Fasteners . . .

Bolt, Nut, Rivet Prices, Page 98

Cleveland — Manufacturers of industrial fasteners are marking time on prices pending announcement of price policy by the steelmakers. Were it not for expected advances on steel, the bolt and nut interests indicate they would have already raised their prices since their costs have been mounting steadily, including two wage boosts since present discount schedules were put into effect. Current thinking on prices is predicated on an anticipated average advance of $10 per ton on steel.

Mounting defense requirements are forcing boltmakers to move cautiously in accepting commitments on run-of-mine account. One producer reports DO and related emergency orders run to surprisingly large total. Steel supply, meanwhile, is shrinking with incoming shipments falling short of outgoing tonnage.

Structural Shapes . . .

Structural Shape Prices, Page 95

New York—Uncertainty with regard to deliveries is making for considerable hesitancy on the part of builders and fabricators. Most fabricators are quoting so far in advance that various builders do not feel like going ahead because of inability to accurately gage costs by that time and fabricators are turning down various projects because of uncertainty as to steel supply. Most shops are booked up anywhere from 10 to 13 months.

Pittsburgh — Fabricators contend operations are 10 per cent below level of last summer and about 25 per cent under that recorded in the spring, due to growing shortage of standard shapes, wide flange beams and plates. Some interests have been successful in booking work of an essential nature, such as Bailey bridges, wind tunnels, etc. Tonnage required for such jobs is deducted from regular mill allotments. Heavy influx of new work combined with retricted operations due to the steel shortage have resulted in lengthened order backlogs which now extend 6 to 8 months in contrast to 4 to 5 months early last summer.

Cleveland—Demand for building steel continues strong although seasonal influences are serving to ease the pressure for shipments slightly. The fact that shape producers are booked into 1951 on structurals precludes any noticeable slackening of buyers' efforts to get tonnage. Emergency requirements, including tonnage for new steel mill and defense construction, will take an increasing amount of total shape production over coming months.

Seattle—Several major structural projects are up for early action, including 15,000 tons for Bonneville transmission towers, bids Nov. 28; 2000 tons for Alaska military warehouses, bids in; and 1000 tons for an Alaskan air field power house, bids Nov. 29. American Bridge Co. is reported to have taken 500 tons for the Snake river joint Idaho-Oregon highway bridge.

Local fabricating plants have fair backlogs, but find it difficult to place business with eastern mills which refuse to make firm commitments for the first quarter.

Plates . . .

Plate Prices, Page 95

Pittsburgh — Producers' January production schedules on DO rated orders are practically filled on the basis of maximum 15 per cent set-aside stipulated by NPA. Amount of preferred tonnage scheduled is augmented further by commitments for iron ore carriers and the railroad freight car program. The trend toward a diminishing tonnage of plates for non-essential use is expected to continue as requirements of petroleum, barge interests and others are formally spelled out by NPA. January rated tonnage will amount to between 20 and 30 per cent of total output of some producers. Nearly the entire output is on a rated basis among those interests that recently started producing plates on strip mill facilities.

Cleveland—Fabricators are turning to foreign markets for supplies in an effort to circumvent the domestic shortage of plates. Substantial tonnages of German plates have been ordered and if satisfactory deliveries are given more tonnage will be placed. While delivered prices on foreign material are considerably above the level of domestic delivered prices they are said to run substantially below prices quoted on plates in the gray market. Expected conversion of several continuous sheet mills to production of light plates provides a ray of hope for some easing of the supply shortage over coming months.

Birmingham—Plates in all gages are in constant demand. The lighter gages which, for a time, were in somewhat less need now are on the scarce list. In addition to large-scale car production, with priorities, tank manufacturers, structurals and miscellaneous plate needs continue considerably above the ability of the district to meet them.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 95

Pittsburgh — Spread between demand and supply of concrete reinforcing bars is expected to widen over coming months. Most marked improvement in demand will be for plant expansion. By-product coke oven producers are concerned over prospect of inadequate steel supply to meet scheduled expansion program on schedule within the steel industry slated for 1951. Order backlogs on sheet and bearing piles are extended eight months in some instances.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 98

Chicago—Some beehive coke is coming into this district but tonnage is not sufficiently great to relieve the pressure from foundries which are finding fuel shortage as much of a deterrent to melting as is short supply of pig iron. High rate of blast furnace operations leaves no slack in coke output.

Wire . . .

Wire Prices, Page 97

Chicago—Good weather this fall has been an important factor in the demand for wire and wire products. This applies particularly to farm fencing and nails for building. Requirements for large sized nails has expanded greatly recently. Baling wire continues in heavy demand. Pressure is strong for welded fabric with needs exceeding quotas in this area.

Birmingham—Jobbers of wire products are doling out their meager supplies not so much on a first come first serve basis as on the basis of trying to take care of regular customers. Some relief is evident in fencing as outdoor agricultural work has slackened. But nails are scarce to the critical point. Most users of manufacturers wire are being reasonably well supplied.

Pig Iron . . .

Pig Iron Prices, Page 94

New York—Many pig iron consumers are operating on a hand-to-mouth basis. Few have more than two weeks' supply on hand and some have not even a week's supply. Various foundries would not be able to sustain operations were it not for increasing consumption of scrap and they are forced to go a bit slowly in that direction because of the steady advance in prices on that material. More orders are being placed for foreign iron, but indications point to still greater stringency before contracts now being placed can be shipped. Late January and early February appear to be about the best that can be done and some foreign sellers claim they have little tonnage left for shipment in first quarter.

Pittsburgh—Pig iron supply is most critical of basic raw materials for foundry interests and no improvement is in sight. Greater utilization of cast scrap and import pig iron to lesser extent has enabled foundries to maintain 5 days per week production schedules. However, demand is such that additional production shifts could be readily added, but can't because of pig iron scarcity.

Cleveland—Pig iron suppliers are unable to keep pace with demand. Shortages in other districts are driving an increasing number of inquiries into this area which sellers cannot possibly accommodate. Foundries are using more scrap but the rise in cast scrap prices argues against much increase in this respect. All blast furnaces in this immediate district, with the exception of one Republic Steel stack, are in operation.

Cincinnati—Furnaces are holding to quotas in shipments of pig iron into this district, although the overall tonnage may be affected by source conditions. Northern iron shipments are off while an Ohio furnace is cold for repairs. Supply is far short of demand which is spurred, in part, by the higher price of foundry scrap.

Chicago—High prices for foundry scrap is indicative of pig iron tightness in this area. Foundries have heavy backlogs and are trying to maintain production by resorting to use of more scrap.

You can make important savings in fuel by taking advantage of the quick heating characteristics of J-M Insulating Fire Brick. These light-weight brick permit a quicker rise to proper operating temperature in the furnace because of their low heat storage capacity, and low thermal conductivity. Where furnaces are being intermittently operated these are two especially important characteristics.

These same insulating materials can also be obtained in large size units called Johns-Manville Insulating *Fireblok*. This product has many advantages over the smaller size fire brick for certain types of jobs . . . from both a construction and stability standpoint. The Fireblok units can be quickly applied because they are easy to cut and fit. Fireblok insulations provide additional heat savings because they reduce the number of joints, and require less mortar for bonding.

It will pay you to let a Johns-Manville insulation engineer explain the many ways in which you can save by using these insulations in your furnaces. Just write for further information to Johns-Manville, Box 290, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

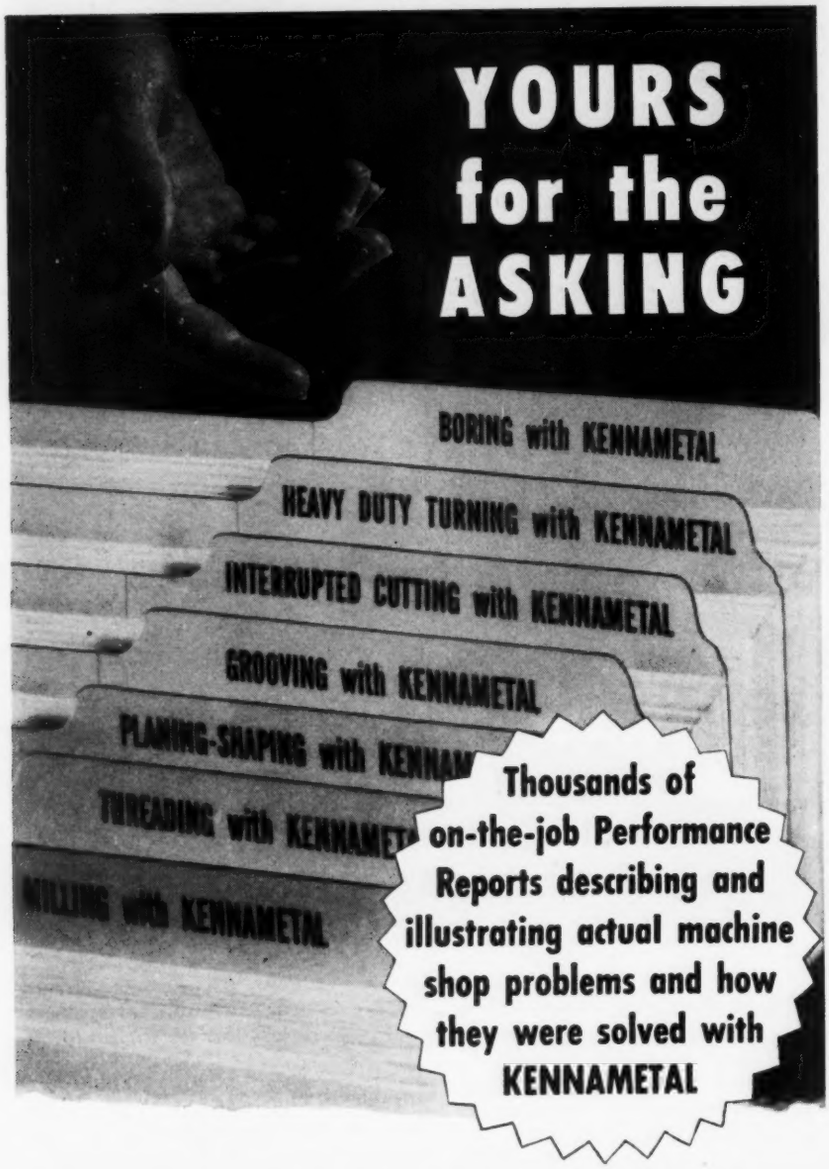
	JM-1620	JM-20	JM-23	JM-26	JM-28	JM-3000
Densities, lb per cu ft	29	35	42	48	58	63-67
Transverse Strengths, psi	60	80	120	125	120	200
Cold Crushing Strengths, psi	70	115	170	190	150	400
Linear Shrinkage†, percent	0.0 at 2000 F	0.0 at 2000 F	0.3 at 2300 F	1.0 at 2600 F	4.0 at 2800 F	0.8 at 3000 F
Reversible Thermal Expansion, percent.	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2,000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F
Conductivity* at Mean Temperatures						
500 F	0.77	0.97	1.51	1.92	2.00	3.10
1000 F	1.02	1.22	1.91	2.22	2.50	3.20
1500 F	1.27	1.47	2.31	2.52	3.00	3.35
2000 F	—	1.72	2.70	2.82	3.50	3.60
Recommended Service						
Back up	2000 F	2000 F	2300 F	2600 F	2800 F	3000 F
Exposed	1600 F	2000 F	2300 F	2600 F	2800 F	3000 F

†24-hr. simulative service panel test for JM-3000; 24-hr. soaking period for other brick.

*Conductivity is expressed in Btu in. per sq ft per F per hour of the designated mean temperatures.

Note: Above tests are in accordance with A.S.T.M. tentative standards.

Johns-Manville *first in* **INSULATIONS**



• Suppose you could ask thousands of practical machine shop men —*"What was the best production idea you had this year?"* Wouldn't their answers save you headaches, time, and money?

Kennametal Inc. has the answers—more *practical* information on jobs of diversified types on all kinds of materials than has ever before been accumulated and offered.

Jobs are classified so that we can send you data sheets on that type of work that interests you. Just ask for Performance Reports and mention the general type of job and material.

Do we have reports on the "tough" jobs you have solved with Kennametal tooling? Our representative who calls on you will appreciate the details.

KENNAMETAL *Inc.*, Latrobe, Pa.

MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES
AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY

Scrap . . .

Scrap Prices, Page 102

Pittsburgh — Relatively little tonnage of open-hearth dealer scrap is outstanding at formula price levels. Occasional mill purchases of dealer scrap are restricted to small lots, resulting in an unusually light movement of such scrap for this season of the year. Dealers and brokers are reluctant to make large tonnage commitments. Prospect of a substantial advance in steel prices, combined with approaching adverse weather conditions which will hamper collection and preparation of scrap, should result in higher scrap price levels, according to some dealers. Machinery cast edged upward again last week to a range of $60-$61. In some instances prices are slightly higher where abnormally large freight is involved.

Cleveland—Undertone of the scrap market is strong. A lull developed last week, however, due to the holiday and advent of adverse weather. Shipments are moving to consumers' plants in good volume. Some tonnages are being held speculatively and others are moving into conversion channels. Due to tightness of supplies, consumers are unable to build up stocks in anticipation of winter needs. Some foundries are in a comfortable inventory position as a result of heavy buying earlier in the year; others have as little as one week's requirements and must depend upon a steady flow of material.

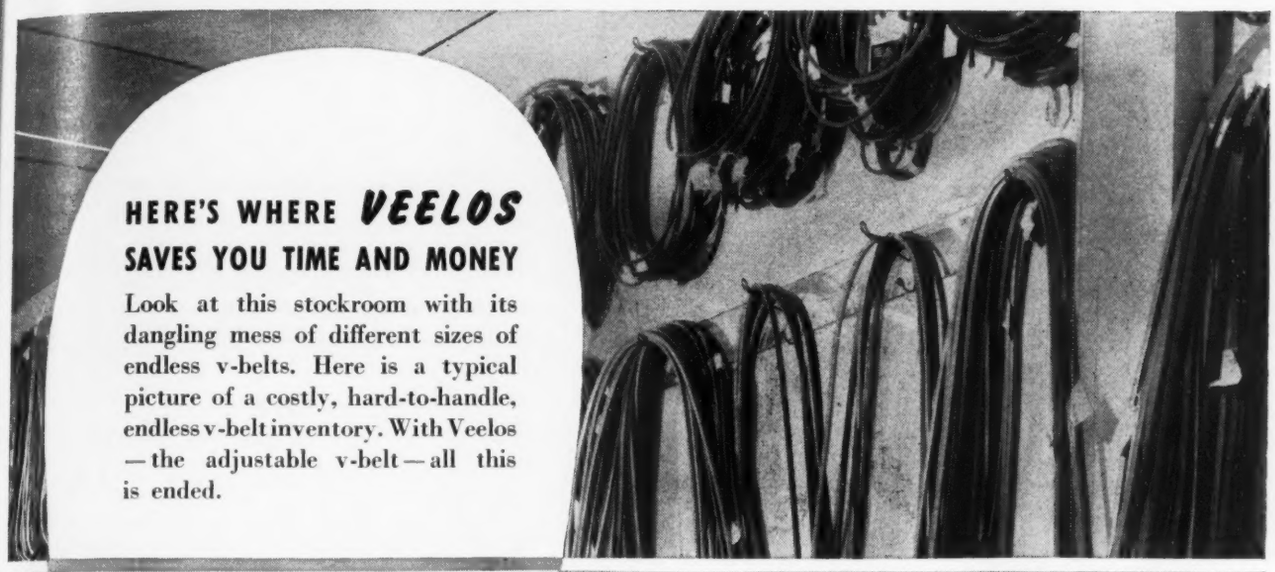
The formula pricing policy is being adhered to closely, but mills are not obtaining as much tonnage as they would like. There is considerable opposition to this pricing system on the part of many foundries. They point out that it is dislocating normal trade in scrap without increasing the tonnage. It is claimed 90 per cent of industrial scrap is foundry size, and yet the bulk of this must be returned to the steel mills.

Cincinnati—Iron and steel scrap prices are unchanged, with strong undertone prevailing. Tonnage is moving freely and most melters are fairly well protected against seasonal tapering in collections.

Philadelphia—Pressure on No. 1 heavy melting steel and No. 1 bundles has eased. At least two consumers who have been paying premiums have held up shipments and some other buyers have been able to close on fair tonnages at $39 delivered, formula price. Apart from No. 1 chemical borings, which have been advanced to $42, all other steel grades are unchanged. In cast scrap, No. 1 machinery is higher at $56-$57 delivered and No. 1 wheels at $64.

Boston—While the formula price is exceeded in scattered cases, the volume of No. 1 heavy melting steel sold higher than $32.92 shipping point is limited. Prices for steel scrap are steady and generally unchanged with No. 1 busheling $29 to $29.50, shipping point. Cast grades are for the most part unchanged with stove plate slightly easier.

Chicago—Mill buying price of $40 for No. 1 heavy melting steel holds tenaciously and one interest reports a purchase at that figure within the past week. The currently high prices for railroad offerings are attributed to foundry influence.



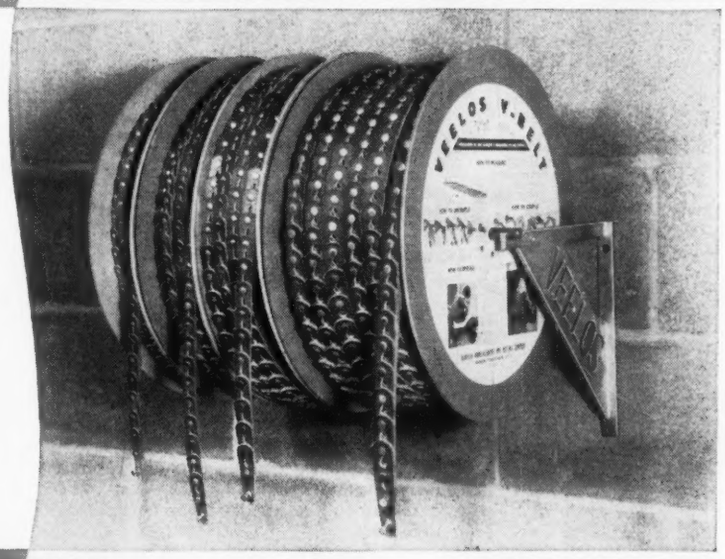
HERE'S WHERE *VEELOS* SAVES YOU TIME AND MONEY

Look at this stockroom with its dangling mess of different sizes of endless v-belts. Here is a typical picture of a costly, hard-to-handle, endless v-belt inventory. With Veelos — the adjustable v-belt — all this is ended.

WITH *VEELOS*, ANY BELT SIZE IS ALWAYS ON HAND

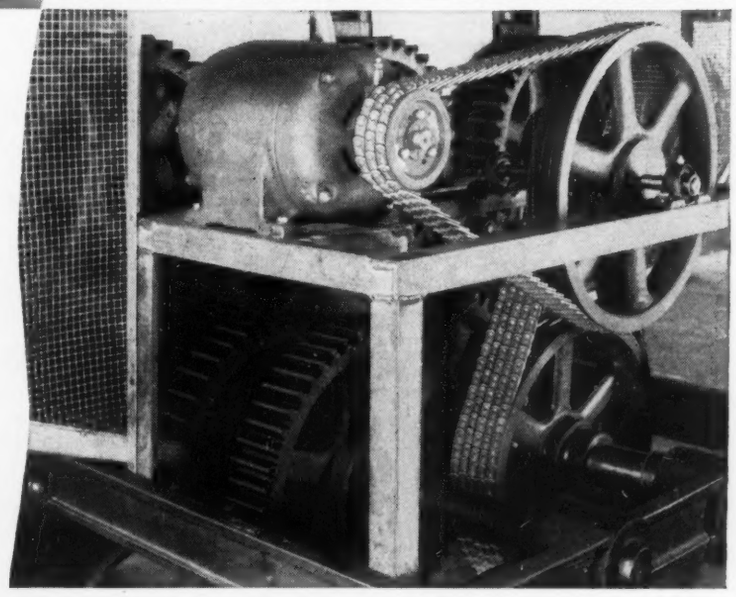
These four reels of Veelos alone can *replace* up to 316 sizes of endless v-belts in the O, A, B and C widths. No more stockroom troubles, no more replacement headaches because Veelos is *always* ready—in the widths you require.

If you are interested in reducing your v-belt costs and increasing your production efficiency, you should have a Veelos Data Book. For free copy of this illustrated book complete with engineering information write*



VEELOS ASSURES MAXIMUM MACHINE PRODUCTION

Veelos is easy to install *without* dismantling outboard bearings. Veelos runs true for vibrationless, full power delivery. Because Veelos is adjustable, uniform belt tension is easily maintained.



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ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. Veelos is known as VEELINK outside the United States.

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Roll Easily, Safely
on Skid-Resistant
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● Vehicles roll straight and true on U·S·S Multigrip Floor Plate. There are no gutters to catch a narrow-wheeled vehicle . . . wheels roll *on* the flat-topped risers, not *between* them. And the sloping sides of the risers make it impossible to catch the toe of a shoe on them.
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Get complete information about safe, *permanent* U·S·S Multigrip Floor Plate at your nearest steel warehouse, or write to us direct.
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United States Steel Export Company, New York
USS
MULTIGRIP FLOOR PLATE
UNITED STATES STEEL

St. Louis—Scrap prices have leveled off for the first time in weeks. Mill inventories, at 90 to 120 days, are highest in months and foundries have curtailed buying in a renewed belief price controls are not far off.

Birmingham — Scrap continued its upward climb last week with increases posted on No. 1 busheling now quoted at $36 to $37; machine shop turnings, $29 to $30; random length scrap rails, $56 to $57, and angles and splice bars, $59 to $60.

Seattle — Some domestic scrap is coming to tidewater, but this supply is inadequate and the outlook is not promising.

Iron Ore . . .

Iron Ore Prices, Page 99

Cleveland — Stocks of Lake Superior iron ore at furnaces in the United States and Canada and on Lake Erie docks in this country totaled 39,710,796 tons on Nov. 1. This is equivalent to nearly 5½ months' requirements, based on current rate of consumption.

Furnaces in the United States had 34,147,455 tons on Nov. 1 compared with 30,065,902 tons a month ago and 37,995,932 tons a year ago, while dock stockpiles amounted to 4,059,373 tons on Nov. 1, 4,327,595 tons on Oct. 1 and 7,432,075 Nov. 1, 1949.

Monthly consumption during the last six months has averaged about 7,400,000 tons. In October it was 7,415,357 tons; in September, 7,174,745 tons; in October, 1949, only 876,792 tons. Total consumption for the first 10 months came to 69,386,717 tons compared with 60,682,584 tons for the like period a year ago.

Shipment of 1,894,879 tons for the week ended Nov. 20 brought the cumulative total for the lake navigation season to that date to 75,531,580 tons. This is only 4,468,420 tons short of the 80 million ton goal set for the season. For the like period a year ago, shipments amounted to 68,792,278 tons.

Warehouse . . .

Warehouse Prices, Page 99

Cleveland — Indications are warehouse steel stocks will continue to shrink under impact of heavy demand and slower deliveries from the mills. Hopes of distributors they would be able to replenish stocks substantially through the remainder of this year and into first quarter of next year were raised by issuance of order M-6 by the National Production Authority. This order gives the warehouses priority in mill shipments after DO and other emergency requirements have been provided. However, inquiry among steel mill executives and NPA officials indicates that order M-6 will have little influence on the volume of mill shipments to warehouses over the next several months.

Chicago — Mills and warehouses continue to study NPA order M-6 and its application and express doubts it will yield to distributors sufficient tonnages to serve the purpose for which the order was intended. Warehouses continue to lose inventories and there are no prospects for replenishment before M-6 becomes fully operative.

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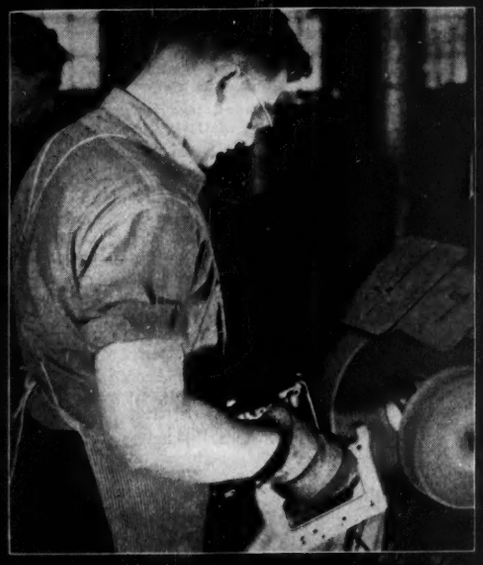
Better Results for *LESS* . . .
on *EVERY* Polishing Job



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NORTON ALUNDUM Abrasive is available in the right grain sizes and with the right treatments to meet the exact requirements of every polishing job.

- For fast cut on roughing operations—where cement is the adhesive—specify S-treated ALUNDUM Abrasive
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If you are barrel-finishing metal parts, ALUNDUM Tumbling Abrasive can save you money.

- It's all abrasive for a continuous cutting action
- It's heavy for a fast, positive cut
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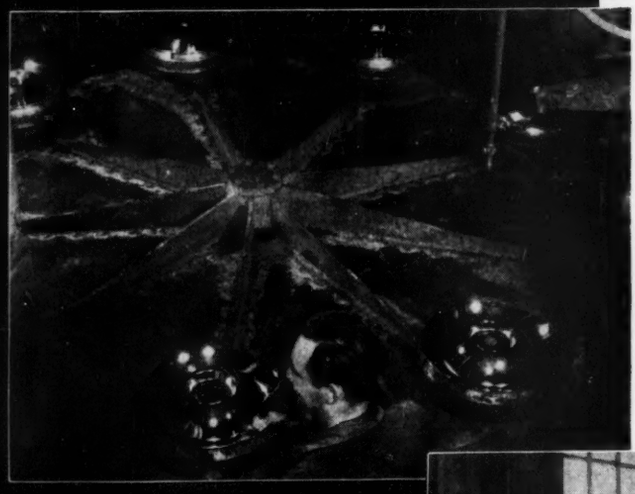
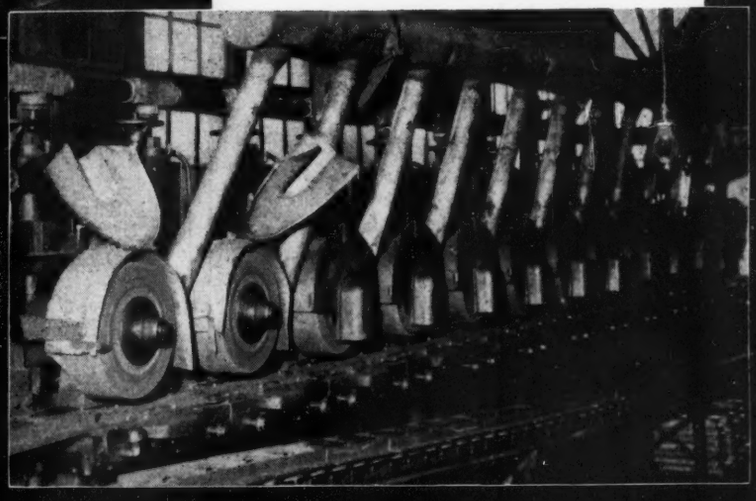
Distributors In All Principal Cities

G-220





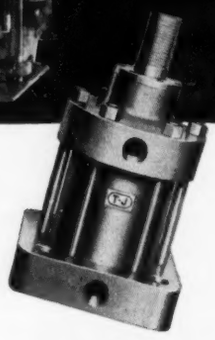
NORTON ABRASIVES

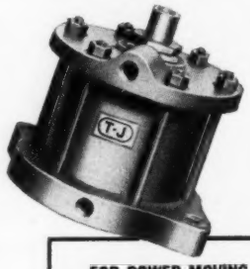
Job File No. 4617

NAILING MACHINE

feeds wood strips automatically with

T-J AIR CYLINDERS





Here's a typical "push-pull" job performed efficiently by T-J Cylinders!

This special nailing machine—equipped with T-J Air Cylinders—is built by Morgan Machine Co., Inc., Rochester, N.Y., for use by Hotpoint in Chicago. The machine is employed to make up skids for mounting electric ranges for shipment. The three boards as shown in the hoppers on top of the machine feed down one at a time while a cross piece from the hopper extended to the right of the machine is fed in. The long T-J Cylinder projecting out in front of the machine feeds the three boards ahead the proper distance and then stops to have a cross piece nailed to them. It then advances automatically to next position until four cross pieces are nailed to the three lateral strips.

For your tough jobs in power movement—pushing, pulling or lifting—*save labor, speed production* and *cut costs* with T-J Air and Hydraulic Cylinders! Many standard sizes and styles . . . both cushioned and non-cushioned types . . . 100 lb. or 50,000 lb. Precision built, versatile, long life. Write for additional information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVING IN ANY DIRECTION

100 LB. or 50,000 LB.

33 YEARS EXPERIENCE

T-J

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3100 tons, New York State Meeker avenue extension viaduct, Brooklyn, N. Y., to Harris Structural Steel Co., New York.

1400 tons, municipal distructor plant, New York, through Merritt-Chapman-Scott, that city, to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, joint Idaho-Oregon bridge, Weiser, Idaho, to American Bridge Co., Portland, Oreg.; J. H. Wise & Sons, Boise, general contract $374,198.

STRUCTURAL STEEL PENDING

15,000 tons, transmission towers, 230-kv Columbia-Grand Coulee line No. 4; bids to Bonneville Power Administration, Nov. 28.

1000 tons, power plant, Eielson Field, Alaska; bids to U. S. Engineer, Seattle, Nov. 29.

537 tons, two bridges for Alaska Railroad; bids to Federal Supply Service, Seattle, Dec. 5.

380 tons, including reinforcing, Frenchman Hills tunnel, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., Dec. 7.

300 tons, plus, joint Oregon-Idaho highway Snake river bridge, near Payette, Idaho; general contract to Lindstrom Bros., Portland, Oreg., low $444,706.

200 tons, including reinforcing, unstated project Richland, Wash.; Peter Kiewit Sons Co., Seattle, low.

100 tons, including reinforcing, Washington state highway bridge, Ferry county; bids to Olympia Nov. 28.

Unstated, military construction, Richland, Wash., general contract to Waale-Campion Co., Portland, Oreg., low $657,127.

Unstated, structures at Hanford, Wash., works; Sound Construction Co., Seattle, low $1,154,203.

Unstated, fixed wheel gates, Canyon Ferry dam penstocks; bids rejected; new bids to Denver soon.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1300 tons, building, Sawyer Biscuit Co., division, United Bakeries Inc., Melrose Park, Ill., to Concrete Steel Co., Chicago.

900 tons, LR 77, Beaver county, Pennsylvania, to Jones & Laughlin Steel Corp., Pittsburgh.

875 tons, hospital, Veterans Administration, Pittsburgh, to United States Steel Supply Co., Chicago.

750 tons, apartment building, Indianapolis, to Pollack Steel Co., Cincinnati.

700 tons, plant addition, Allis-Chalmers Mfg. Co., LaPorte, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Calumet Paving Co., Indianapolis, general contractor.

625 tons, biology building, Argonne National Laboratory, Lamont, Ill., to Bethlehem Steel Co.; S. N. Nielsen Co., Chicago, general contractor.

450 tons, expansion, Sunbeam Corp., Cicero, Ill., to Ceco Steel Products Corp., Cicero, Ill.

435 tons, Yakima river bridge, Washington state, to Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engineering Co., Seattle, general contract $472,606.

400 tons, science building, University of Notre Dame, South Bend, Ind., to Olney J. Dean Steel Co., Chicago; George Sollitt Construction Co., Chicago, general contractor.

365 tons, building, Colgate-Palmolive-Peet Co., Jeffersonville, Ind., to Laclede Steel Co., St. Louis.

300 tons, Calumet intercepting sewer, cont. 18D, Blue Island, Ill., to United States Steel Supply Co., Chicago.

180 tons, bridge, Hudson, Wis., to United States Steel Supply Co., Chicago.

178 tons, LR 765, Allegheny county, Pennsylvania, to Electric Welding Co., Pittsburgh.

172 tons, dormitory, Faribault, Minn., to Hustad Co., Minneapolis.

"I believe every company should . . ."

MR. CLARENCE FRANCIS

Chairman of the Board, General Foods Corporation

"I believe every company should conduct a person to person canvass right now, for the best way to promote the sale of U. S. Savings Bonds is to put an application card into each employee's hand and allow him to reach his own decision."

As one of America's top executive salesmen, Mr. Clarence Francis knows that you sell more when you "ask the man to buy." Naturally, that means a person to person canvass of *all* your employees, but it is not as difficult as it may sound. In fact, it is very simple:

Tell your employees personally—or over your signature—why the automatic purchase of Savings Bonds through the Payroll Savings Plan is good for them and their country.

Designate your Number One Man to organize the canvass and keep it moving.

Enlist the aid of employee organizations—they will be glad to cooperate with you.

With posters, leaflets, and payroll envelope enclosures remind your employees of the many benefits of the Payroll Savings Plan. Your State Director, U. S. Treasury Department, Savings Bonds Division, will furnish you, free of charge, all the promotional material you can use.

Be sure that every man and woman on the payroll is given a U. S. Savings Bond Application Form.

Thousands of companies, large and small, have just completed or are now conducting person to person canvasses. Their reports are a challenge to every company that does not have a Payroll Savings Plan . . . 50% employee participation . . . 60% employee participation—some of them have gone over 80%.

All the help you need to conduct your person to person canvass is available from your State Director, U. S. Treasury Department, Savings Bonds Division. Get in touch with him.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the G. M. Basford Company and

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High Temperature
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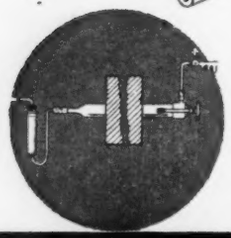

McDanel Porcelain Combustion Tubes and Zirco Tubes are precision made. Density, bore size, wall thickness, etc. are carefully controlled to assure maximum resistance to thermal shock, accurate fit and gas tightness. Cast as a single unit, they defy devitrification—give longer service and lower replacement costs. For carbon and sulphur determinations, McDanel Tubes are *tops*.

Leading metallurgists in the steel and iron industries say: "McDanel Tubes stand up well under extremes in temperature"—"Never spall or blister"—"Highly satisfactory in every respect".

Specify McDanel High Temperature Porcelain Combustion Tubes and Zirco Tubes from your supplier.

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OTHER McDANEL PRODUCTS

- Non-spalling, non-blistering, gas tight Combustion Tubes.
- High Temperature Zirco Tubes.
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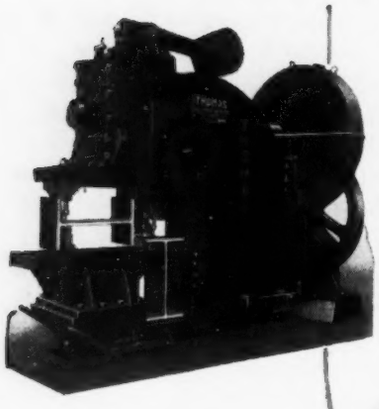
- Refractory Porcelain Specialties in stock or designed to meet your needs.

BEAM PUNCHING

without tool change



The NEW Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

Write for detailed information

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH (23). PA.

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

22

160 tons, Eshelman Grain Co., Columbus, O., to United States Steel Supply Co., Chicago.

150 tons, Alaska military installation, to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Morrison-Knudsen Co., Seattle.

140 tons, exchange building, Illinois Bell Telephone Co., Bellwood, Ill., to Joseph T. Ryerson & Son Inc., Chicago; Robert G. Regan Co., Joliet, Ill., general contractor.

100 tons, paper mill expansion, to Northwest Steel Rolling Mills Inc., Seattle; H. S. Wright Co., Seattle, general contractor.

100 tons, filtration plant, Lynden, Wash., to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

1500 tons, two concrete roadway deck slabs, New Jersey turnpike, Kearny-Newark, N. J., bids Dec. 5, New Jersey Turnpike Authority.

660 tons, Cleveland Electric Illuminating Co., Eastlake, O.

650 tons, athletic stadium, Milwaukee.

650 tons, vault, Harris Trust & Savings Bank, Chicago; bids Nov. 14.

600 tons, Tacoma, Wash., treatment plant, general award to Hoagland-Findley Engineering Co., Seattle, $1,326,920.

550 tons, laboratory and research building, Atomic Energy Commission, Newport, Ky.

535 tons, expansion, Hall Printing Co., Chicago.

350 tons, stores and office building, Equitable Life Assurance Society, Pittsburgh.

310 tons, Franklin D. Roosevelt Homes, St. Paul.

280 tons, two Washington state highway girder spans, Lewis county; bids to Olympia Nov. 28.

220 tons, building, John M. Smyth Co., Chicago.

218 tons, addition, Oak Park Hospital, Oak Park, Ill.; new bids asked.

160 tons, hospital, McKeesport, Pa.

130 tons, Alaska Railroad bridges; bids to Federal Supply Service, Seattle, Dec. 5.

120 tons, expansion, Linde Air Products Co., East Chicago, Ind.

115 tons, 163-foot, three-span continuous rolled beam bridge, Darien, Conn.; bids in; also 200 tons steel piles and 250 tons, structural steel.

100 tons, store, Hart, Shaffner & Marx, Joliet, Ill.

100 tons, including piling, Washington state girder span and underpass, Cowlitz county; bids to Olympia Nov. 28.

PLATES . . .

PLATES PLACED

650 tons, Cushman power plant penstocks, Tacoma light department, to Willamette Iron & Steel Co., Portland, Oreg., low $237,073.

PLATES PENDING

133 tons, galvanized hull plate, various deliveries, Navy, Washington; bids Dec. 1.

PIPE . . .

STEEL PIPE PENDING

Unstated, 7000 feet 20 and 12 inch mains for filtration plant project; bids to Pasco, Wash., soon; plans in preparation.

CAST IRON PIPE PENDING

100 tons plus, Olympic View water district, Snohomish county, Washington; 6400 feet 8 and 6 inch Class 150 and accessories; bids to Everett, Wash., Nov. 27.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Argentine National, thirty 1400-hp diesel-electric locomotives, to International General Electric Co., Schenectady, N. Y.

Canadian National, 40 diesel-electric locomotive road freight units; twenty-eight 1500-hp units to General Motors Diesel Ltd., Toronto, Ont., and twelve 1600-hp units to Montreal Locomotive Works, Montreal, Que.

UNIVERSITY OF MICHIGAN LIBRARIES

RAILROAD CARS PLACED

Bessemer & Lake Erie, 500 ninety-ton hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Milwaukee, St. Paul & Pacific, 330 freight cars, to its own shops; list comprises 250 covered hopper cars, 50 caboose cars and 30 gondola cars.

Chicago & North Western, 7 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Rock Island & Pacific, 500 seventy-ton gondola cars, to American Car & Foundry Co., New York.

Denver & Rio Grande Western, 10 caboose cars to its own shops.

Detroit, Toledo & Ironton, 500 freight cars; 300 fifty-ton automobile box cars, going to General American Transportation Co., Chicago, and 200 seventy-ton gondolas to American Car & Foundry Co., New York.

Great Northern, 100 seventy-ton covered hopper cars, to American Car & Foundry Co., New York.

Kansas City Southern, 100 fifty-ton automobile box cars, to General American Transportation Co., Chicago.

Lake Terminal, 150 seventy-ton gondola cars and 150 seventy-ton hopper cars, to Magor Car Corp., New York.

Mather Stock Car Co., 100 forty-ton refrigerator cars, to its own shops.

Newburgh & South Shore, 100 seventy-ton gondolas to Magor Car Corp., New York.

New York, Chicago & St. Louis, 200 freight cars, comprising 150 seventy-ton flat cars and 50 seventy-ton hopper cars, to Greenville Steel Car Co., Greenville, Pa.

Union, 500 seventy-ton gondolas to Greenville Steel Car Co., Greenville, Pa.

Wabash, 50 seventy-ton gondola cars, to American Car & Foundry Co., New York.

Youngstown & Northern, 150 seventy-ton gondola cars, to Greenville Steel Car Co., Greenville, Pa.

RAILROAD CARS PENDING

Chicago, Rock Island & Pacific, 3000 box cars; purchase authorized.

Pennsylvania, 66 passenger cars, award expected shortly; list will include 32 coaches, 16 parlor cars, 4 coach-lounge cars, 4 parlor-observation-lounge cars, 4 twin-unit dining cars and 2 conference room cars.

RAILS PLACED

New York Central, 101,300 tons of rail, orders going to Carnegie-Illinois Steel Corp., Pittsburgh, Bethlehem Steel Co., Bethlehem, Pa., and Inland Steel Co., Chicago; the rail will be of 105 pound, 127 pound and 132 pound weights, for installation during 1951 by Central and affiliated railroads.

FERROALLOYS

(*Continued from page 99*)

Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 33.35c per lb of contained Cr, 0.04% C 31.25c, 0.06% C 30.25c, 0.10% C 29.75c, 0.15% C 29.50c, 0.20% C 29.25c, 0.50% C 29.0c, 1% C 28.75c, 1.50% C 28.60c, 2% C 28.5c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 MxD, bulk, 23.25c per lb of contained Cr, c.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, Carload, packed, 8 MxD, 16.10c per lb of alloy; 1 ton 16.95c; less ton lot, 18.15c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34.41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.00c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

A press brake equipped with Wittek No. 6-L Automatic Roll Feed

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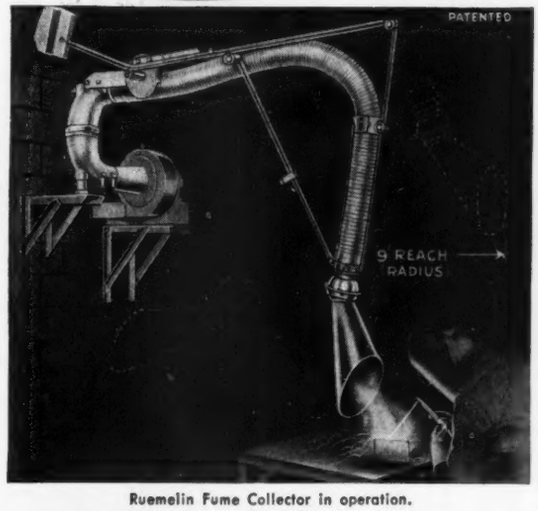

Ruemelin Fume Collector in operation.

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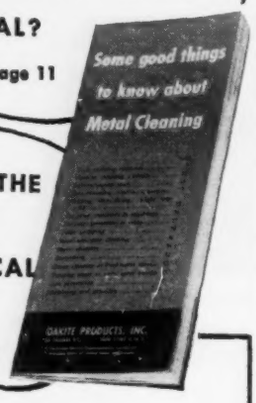
WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11

WHAT'S THE MOST ECONOMICAL WAY?
See page 9



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¶ What kind of cleaner attracts both oil and water? How does this help remove buffing compound residues and pigmented drawing compounds? See Page 8.

¶ What are the advantages of reverse current for electrocleaning steel? See page 15.

¶ Can you electroclean brass without tarnishing? See page 18.

¶ Can you clean steel and condition it for painting for less than 20 cents per 1,000 square feet? See page 26.

¶ Would you like a cleaner that removes rust and oil in one operation, often eliminating all need for pickling? See page 28.

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Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.0c per lb of contained silicon plus aluminum, 2" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium, ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.75 per lb of contained W; 2000 lb W to 10,000 lb W, $2.85; less than 2000 lb W, $2.97. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $3.65 per lb of contained W; less than 1000 lb W, $3.75.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 19.00c per lb of contained Si; packed 20.40c; ton lot 21.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.0c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c. Delivered, Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered, Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 15.55c per lb of contained Si, carload packed 16.8c ton lot 17.8c, less ton 18.95c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 90-95% ferosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.65c per lb of alloy, ton lots packed 10.05c, 200 to 1999 lb 10.40c, smaller lots 10.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton lot 16.0c, less ton 16.9c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.85c, per lb of briquet, c.l. packaged 11.65c, ton lot 12.45c, less ton 13.35c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si) Contract, carload, bulk 6.75c per lb of briquet, c.l. packed 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.
(Small size—weighing approx 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c, c.l. packed 7.7c, ton lot 8.5c, less ton 9.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.04 per pound of Mo contained, f.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 21.0c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-41%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $167 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $183 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.00 per lb of contained Va. Delivered. Spot, add 10c. Crucible-Special Grades (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.10. Primos and High Speed Grades (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.20.

Grainal: Vanadium Grainal No. 1, 93c per lb; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Zirconium Alloys

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, delivered; less ton lots $3.80.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.0c per lb of alloy; ton lots 18.0c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.22; Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth $1.04, packed in bags containing 20 lb of molybdenum; Washington, Pa., 95.00c.

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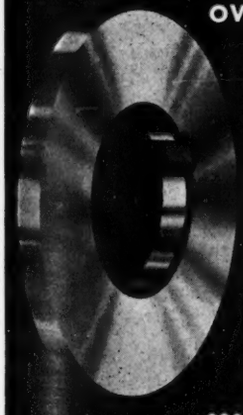

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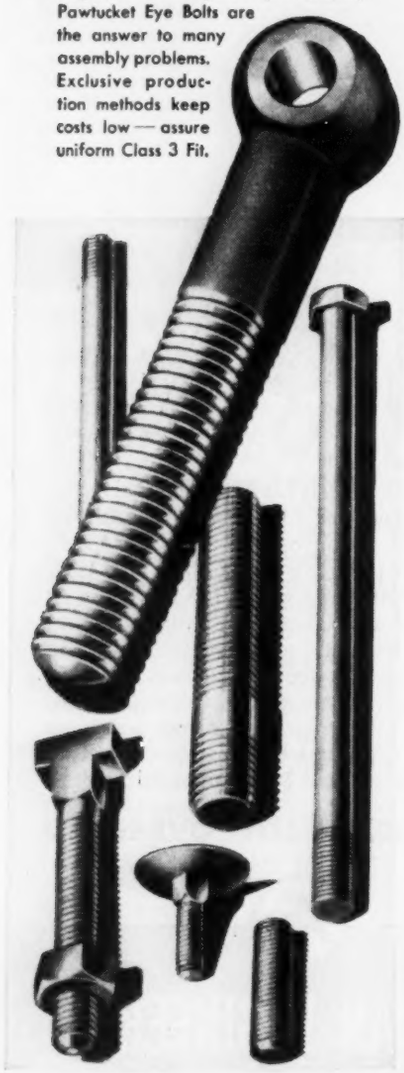

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Delaware

Kropp Forge Ordnance Co.—machinery— was chartered by the secretary of state's office, Dover, Del. Capital of the firm is listed at $500,000. United States Corporation Co., Dover, is serving as the principal office.

Delaware

Central Farm Equipment Co.—machinery—filed a charter of incorporation with the secretary of state's office, Dover, Del. Capital of the firm is listed at $120,000. United States Corporation Co., Dover, is serving as the principal office.

Delaware

Synchro Electronic Corp.—welding—was chartered by the secretary of state's office, Dover, Del. Capital of the firm is listed at $600,000. Registrar & Transfer Co., Dover, is serving as the principal office.

Delaware

Copco Eastern Ltd.—machinery—filed a charter of incorporation with the secretary of state's office, Dover, Del. Corporation Trust Co., Wilmington, Del., is the principal office.

Delaware

Strategic Metals Inc.—metals—filed a charter of incorporation with the secretary of state's office, Dover, Del. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Florida

Glidden Co., Cleveland, is increasing capacity of its Naval Stores Division at Jacksonville, Fla., 30 to 50 per cent. Cost is estimated at $200,000.

Illinois

Pennsylvania Salt Mfg. Co., Philadelphia, moved its Chicago district sales office to 228 N. LaSalle St. The office is under the direction of G. D. Grogan, district sales manager, heavy chemicals department, and J. C. Hampson, district sales manager, special chemicals department.

Illinois

R. Herschel Mfg. Co., Peoria, Ill., is planning construction of a $100,000 distributing center at Westwood and Hill avenues, Toledo, O. The firm manufactures cutting attachments for mowers, binders and other agricultural implements, supplies and farm specialties.

Kentucky

Plans are under consideration for erection of a $5 million atomic energy plant to be built at the **Wabash River Ordnance Works**, Newport, Ind., by Girdler Corp., Louisville.

Maine

Allis-Chalmers Mfg. Co., Milwaukee, opened a branch office in Augusta, Me., under management of D. P. Appleton. Harold S. Millay, service supervisor in the Boston district office, was named a sales representative in the Augusta office. C. W. Schweers is manager of the New England region of the General Machinery Division.

Maryland

Brass Art Crafts Co., Baltimore, moved from 5226 Fairlawn Ave., into a building to the rear of 5240 Reisterstown Rd.

New York

U. S. Hoffman Machinery Corp., New York, is reactivating the naval industrial reserve ordnance plant at Poughkeepsie, N. Y., for the manufacture of naval ordnance. During World War II, Hoffman established and operated the Poughkeepsie plant for the manufacture of Navy projectiles. It also produced naval ordnance materials at one of its Syracuse, N. Y., plants. The company also produces dry cleaning, laundry and pressing machines, industrial filtration and vacuum cleaning equipment.

New York

Eastern Steel Tank Corp.—storage tanks and steel plate construction—moved its plant and headquarters to a new building at the foot of 40th road, Flushing, N. Y.

New York

Corrosite Corp., New York, appointed **Graybar Electric Co. Inc.**, that city, national distributor for its antiacid, corrosion-resistant plastic paints. Graybar will offer the product through its 103 houses located in principal cities throughout the country to industrial, utility and railroad users having special corrosion problems. L. W. Taylor, manager, outside construction sales, will be in charge of all sales activities on the Corrosite line for Graybar Electric.

New York

James Mfg. Co. will move its operations to Mt. Joy, Pa., about Jan. 1. The firm, located in Elmira, N. Y., since 1941, produces ventilating equipment.

New York

Master Wire Die Corp. moved its offices and plant to Route 9W, Stony Point, N. Y. The company's telephone number is Stony Point 6-5224.

New York

Richardson-Allen Corp., manufacturer of rectifiers, battery chargers and various types of industrial controls, moved into its new office and factory at 116-15 Fifteenth Ave., College Point, Long Island, N. Y.

Michigan

Buick Motor Division, General Motors Corp., awarded a contract for a 170,000 square foot addition to its foundry in Flint, Mich. The structure is expected to be completed in May. The foundry will have a 30,000 square foot area for dockage and will house a cleaning room. The structure has an unusual feature, a basement where employee locker rooms will be located. Air in the building will be washed and changed faster than once a minute.

Ohio

Electro-Metallurgical Division, Union Carbide & Carbon Corp., New York, is doubling the capacity of its plant at Gravel Bank, O. Original plans for three furnaces have been amended to make arrangements for nine. The new plant is scheduled for operation in June.

Ohio

Lisbon Spring & Wire Co. was incorporated in Lisbon, O., through Franklin D. Dougherty, Penobscot Bldg., Detroit, with Joseph Hyde, David C. Park and Fred F. Bilky as in-

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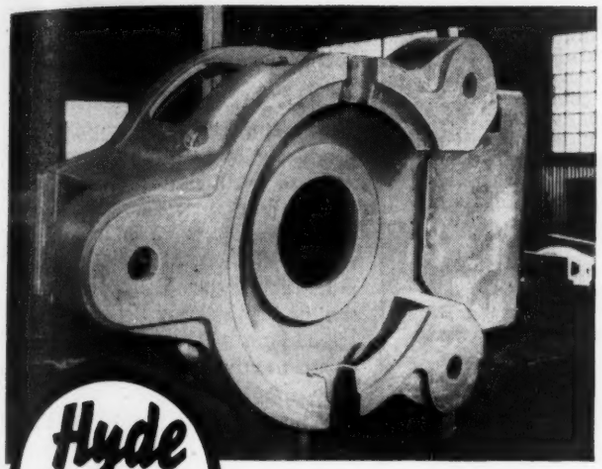

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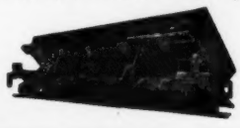

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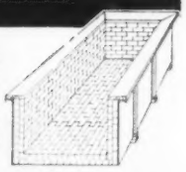
CONSTRUCTION MATERIALS

CORROSION PROOF LININGS



There is an Atlas Corrosion Proof Lining to solve every corrosion problem. Atlas Linings are based on many different plastics as well as natural and synthetic rubber. Installed at Atlas or customers plant.

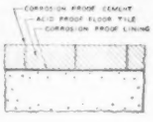
CORROSION PROOF CEMENTS

Each Atlas Corrosion Proof Cement has physical and chemical properties best suited for specific applications. Consult Atlas Technical Service to insure usage of the most durable and economical cement.

PROTECTIVE COATINGS

Atlas offers a complete line of Corrosion Proof Protective Coatings. The recommendations of a coating most suitable for customers application is a regular Atlas Service.

CORROSION PROOF INDUSTRIAL FLOORS



Composed of acid and alkali proof brick or tile and acid and alkali proof cement. The choice of materials involves a thorough study of conditions and materials being handled. Our Engineering Department will be pleased to help without charge or obligation.

Write for your copy
General Bulletin
MCC No. 1

Contains information on Atlas' complete line of Chemical Construction Materials. Write to 14 Walnut St., Mertztown, Pa.

ATLAS TECHNICAL SERVICE

The services of our Engineering Department and Research Laboratories are available without cost or obligation.

ATLAS TRADE NAMES

ALKOR 5E
CARBO-KOREZ
VITREX
ATLASTAVON
ATLASTISEAL
ZEROK
ALKALOY
AMPVAR

THE ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNA. **HOUSTON, TEXAS**

PAGE WIRE

LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

You draw the Shape
—Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part.

Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

for Wire or Information about Wire—

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ACCO
Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

corporators. Leland Firestone, 405 E. Chestnut St., Lisbon, is statutory agent for the corporation. The company is capitalized with 1500 shares of $100 par value common stock. While details of company plans have not been announced, it is understood that the firm will operate a factory in Lisbon to manufacture wire products, including springs, stampings and other items.

Ohio

Bryant Heater Division, Affiliated Gas Equipment Co., Cleveland, is planning a $250,000 addition to its plant at 17825 St. Clair Ave., that city.

Ohio

Owen Structural Steel Co. was incorporated in Youngstown to manufacture and deal in steel and steel products. The incorporators are James A. Owen, James A. Owen Jr., and Raymond S. Powers, 705 Union National Bank Bldg., that city, who is the statutory agent.

Ohio

Construction of the $3 million auto stamping plant of **Kaiser-Frazer Corp.,** Willow Run, Mich., is under way in Shadyside, O., and will be rushed to completion at the earliest possible moment. The plant is officially christened Shady Willow.

Ohio

Autocall Co., Shelby, O., is planning the immediate construction of an addition to increase its manufacturing space in the Shelby plant by 50 per cent. The company makes electrical signaling and control equipment.

Ohio

Kirtland Machine Tool Inc. was incorporated in Kirtland (Lake county), O., by John S. McGranahan, statutory agent, John P. Nally, Howard Blackett and Patricia Hercl. The company will operate a factory to produce tools, dies, gages and other items.

Ohio

Alvin Co. Inc. was incorporated in Cleveland to engage in the manufacture of batteries and related items. Incorporators are Harold H. Gorman, and Frederick C. Troll. Frank M. Gorman is statutory agent with offices at 1668 Union Commerce Bldg.

Ohio

Central Ohio Steel Products Co., Galion, O., leased the plant of Cardington Machine Works Inc., Cardington, O. Central Ohio will operate the plant as the Cardington Metal Products Co.

Ohio

Arbor Tool Co. is in production at its new plant, 1506 Milburn Ave., N. Dayton, O. The company manufactures tools, dies and jigs.

Ohio

Serco Screw Machine Products Inc. was incorporated in Johnsville, O., to manufacture screw machine products. Incorporators are Hyman Rabin, statutory agent, Lydia H. Smith and Allan Engel.

Ohio

Luntz Iron & Steel Co., Warren, O., purchased the American Sintering Co.'s idle plant at Hubbard, O., and will reactivate it immediately. Luntz will use the yard for cutting up scrapped steam locomotives, cars and other scrap, most of which will go to Mahoning Valley steel plants.

Number, Please

WORLD'S LARGEST telephone set manufacturing plant—capable of producing more sets in one year than all the telephones in operation in France and Canada—was placed in operation in Indianapolis by Western Electric Co. Inc., manufacturing and supply unit of the Bell Telephone System. It's located on a 133-acre tract and covers nearly 20 acres. It will employ about 6000.

Why was a plant its size needed? G. F. Raymond, plant manager, says to meet requirements of the nation's rapidly expanding telephone network; there are 34,750,000 Bell system telephones in operation now—over 2 million more than there were a year ago; the plant will be the system's only source of telephone sets.

Ohio

Curtiss-Wright Corp., New York, discontinued operations in its Columbus, O., plant on Nov. 24. **North American Aviation Inc.** is taking over certain purchase commitments as of Nov. 25. However, the plant will be shut down during the week from Nov. 25 through Dec. 3.

Oklahoma

H. K. Porter Co. Inc., Pittsburgh, forms Jarecki Valve Division, Tulsa, Okla., to handle the manufacture and sale of Jarecki valves, formerly produced at Jarecki Mfg. Co.'s plant in Erie, Pa. Established in 1852, the Jarecki company manufactured a complete line of iron and bronze valves and cocks. These will now be produced in H. K. Porter's Hinderliter Tool Co. Division plant at Tulsa. Jarecki valves have wide application in oil and gas, plumbing and heating, power and general industrial fields.

Pennsylvania

Erie City Iron Works, Erie, Pa., is planning the immediate erection of a $50,000 office building adjacent to its present site at 14th street and Erie avenue. It will house a large drafting room in addition to other offices.

Wisconsin

MacDermid Inc., Waterbury, Conn., appointed Donald Sales & Mfg. Co., Milwaukee, as exclusive distributor in Wisconsin for its complete line of metal cleaners, bright copper and other metal finishing preparations. T. F. O'Brien, MacDermid sales engineer, is available for customer service concerning any metal finishing problem.

Canada

Courtauld's (Canada) Ltd. is planning a $3 million expansion of its facilities in Cornwall, Ont., for 1951. The company, which produces rayon staple fiber, completed a $17 million expansion and modernization program in 1949.